



Contract No. 68-W-98-210

RAC II

***Remedial Response, Enforcement Oversight
and Non-time Critical Removal Activities
at Sites of Release or Threatened Release
of Hazardous Substances in EPA Region II***

CDM

**REVISED HEALTH AND SAFETY PLAN
OLD ROOSEVELT FIELD CONTAMINATED
GROUNDWATER AREA SITE
REMEDIAL INVESTIGATION/
FEASIBILITY STUDY
NASSAU COUNTY, NEW YORK**

**Work Assignment No. 146-RICO-02PE
June 20, 2005**

**Prepared for:
U.S. Environmental Protection Agency
290 Broadway
New York, New York 10007-1866**

**Prepared by:
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New York, New York 10038**

EPA Work Assignment No.	:146-RICO-02PE
EPA Region	: II
Contract No.	: 68-W-98-210
CDM Federal Programs Corporation	
Document No.	: 3223-146-PP-HASP-05507
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Date Prepared	: June 20, 2005

**Old Roosevelt Field Contaminated Groundwater Area Site
Garden City, New York**

**HEALTH AND SAFETY PLAN
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The CDM Federal Health and Safety Manual will be kept on-site. It covers all the required Health and Safety Plan elements not detailed in this Health and Safety Plan Form.

ACRONYMS

APR	Air Purified Respirator
CDM	CDM Federal Programs Corporation
CRZ	Contamination Reduction Zone
DCE	Dichloroethylene
EPA	(United States) Environmental Protection Agency
eV	Photoionization Potential
EZ	Exclusion Zone
HSM	Corporate Health and Safety Manager
HSP	Health and Safety Plan
IDLH	Immediately dangerous to Life or Health
LEL	Lower Explosive Limit
mg/m ³	Milligrams/Cubic Meter
MSDS	Materials Safety Data Sheet
msl	Mean sea level
PCB	Polychlorinated biphenyls
PCE	Tetrachloroethylene
PEL	Permissible Exposure Limit
POTW	Publically Owned Treatment Works
PPE	Personal Protective Equipment
ppm	Parts Per Million
RI/FS	Remedial Investigation/Feasibility Study
SCBA	Self Contained Breathing Apparatus
SHSC	Site Health and Safety Coordinator
SZ	Support zone
TCE	Trichloroethylene
TLV	Threshold Limit Value
TWA	Time Weighted Average
µg/L	Microgram/Liter
USGS	United States Geological Survey

HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

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CDM FEDERAL PROGRAMS

PROJECT DOCUMENT #: 3223-146-PP-HASP-05181

PROJECT NAME

Old Roosevelt Field Contaminated GW

Area Site

PROJECT# 3223-146**REGION**

New York

SITE ADDRESS

Clinton Road

Garden City, New York

CLIENT ORGANIZATION

USEPA

CLIENT CONTACT

Caroline Kwan

CLIENT CONTACT PHONE #

212-637-4275

(x) AMENDMENT TO EXISTING APPROVED H&SP?

CDM SITE MANAGER PHONE #

203-262-6633

() H&SP AMENDMENT NUMBER? _____

() DATE OF APPROVED H&SP _____

OBJECTIVES OF FIELD WORK:

(e.g. collect surface soil samples):

•Mud Rotary Drilling and Vertical Profile Groundwater

•Outer casing and Multiport Well Installation

•Multiport Monitoring well sampling

•Existing monitoring well and supply well sampling

•Air monitoring and air vapor sampling

• Soil gas survey and sampling

SITE TYPE:*Check as many as applicable*

Active

()

Landfill

()

Unknown

()

Inactive

(X)

Uncontrolled

()

Military

()

Secure

()

Industrial

()

Other:

Unsecure

(X)

Recovery

()

Residential (X)

Enclosed space

()

Well Field

(X)

Commercial (X)

All requirements described in the **CDM Federal Health and Safety Program Manual** are incorporated in this health and safety plan by reference. A copy of the manual will be kept on-site**PERSONNEL AND RESPONSIBILITIES****NAMES OF WORK CREW MEMBERS****COMPANY or
DIVISION****CDM HEALTH
CLEARANCE****PROJECT OR SITE
RESPONSIBILITIES****Tasks
On Site?**

Susan Schofield

CDM

Yes

Project Manager

Lisa Campbell

CDM

Yes

RI Task Leader

1-2-3-4-5-6-7

April Caruso

CDM

Yes

Field Team Leader, Site H&S

1-2-3-4-5-6-7

Tonya Bennett

CDM

Yes

Geologist

1-2-3-4-5-7

Zeb Maharrey

CDM

Yes

Geologist

1-2-3-4-5-7

Drillers, Waste Haulers, Cultural Resources Surveyors,
Multiport Well Specialist, and Geophysical Surveyors

Subcontractor

2-3-4-6-7

BACKGROUND REVIEW:

(x) Complete () Incomplete

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HEALTH AND SAFETY PLAN FORM

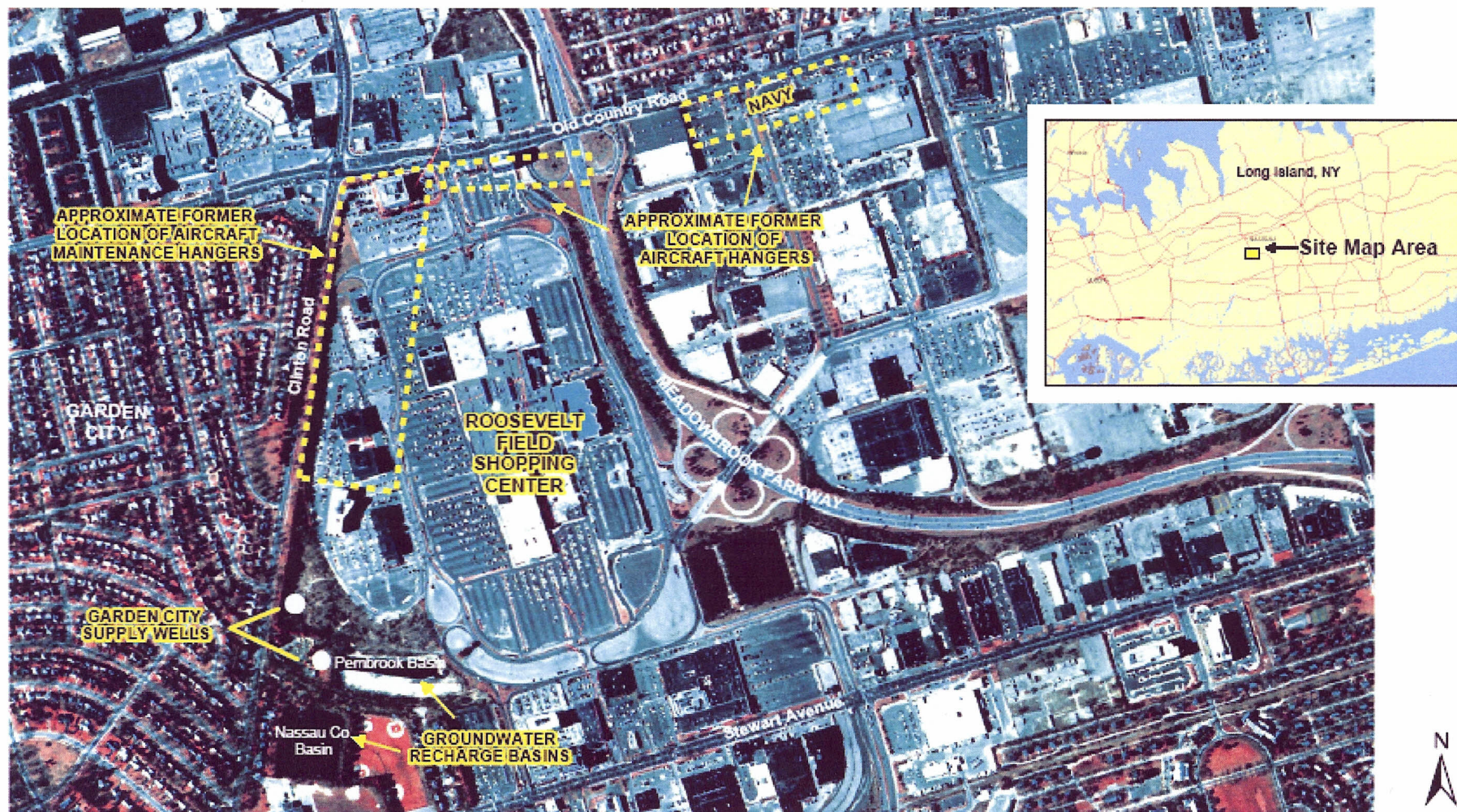
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PROJECT DOCUMENT #: 3223-146-PP-HASP-05181

SITE MAP:



adapted from NYSDEC Interactive Mapping Gateway: <http://www.nygis.state.ny.us/gateway/index.htm>

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HEALTH AND SAFETY PLAN FORM**CDM Health and Safety Program**

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CDM**PROJECT DOCUMENT #: 3223-146-PP-HASP-05181****HISTORY:**

Roosevelt Field was used for a variety of aviation activities from 1911 until May 1951. The original airfield, known as the "Hempstead Plains Aerodrome", encompassed 900 to 1,000 acres east of Clinton Road and south of Old Country Road. The United States military began using the Hempstead Plains field before the U.S. entered World War I. When the U.S. entered the war in April 1917, the airfield was taken over as a training center for military pilots and renamed Hazelhurst Field. On September 24, 1918, the Army changed the name to Roosevelt Field.

After World War I, the U.S. Air Service authorized some companies to operate from Roosevelt Field but maintained control until July 1, 1920, when the Government sold its buildings and improvements and relinquished control of the field. Subsequently, the property owners sold portions along the southern edge of the field and split the remainder of the property into two separate fields, Roosevelt Field on the eastern half and Curtis Field on the west. Both fields were bought in 1929 by Roosevelt Field, Inc., and the consolidated property called Roosevelt Field. The eastern field was sold in 1936 and became a racetrack; the western field at the corner of Clinton and Old Country Roads continued to operate as an aviation center.

During World War II, Roosevelt Field was used by the Navy and Army. After the war, Roosevelt Field reverted to a commercial airport until it closed in May 1951. Building construction at the site began in 1956. The Roosevelt Field Shopping Mall and Garden City Plaza currently occupy the area that was Roosevelt Field.

Currently, the contaminated plume is documented by the presence of PCE, TCE, carbon tetrachloride, and 1,1-dichloroethene (1,1-DCE) at concentrations that exceed health benchmarks. Historically, the highest levels of TCE (at 38,000 µg/L in 1984) were detected in former cooling water well N8050, located approximately 2,000 feet north-northeast of the Garden City wells. The two Garden City supply wells and well N8050 are located on the property that historically was Roosevelt Field. The sources of contamination are suspected to be the airport hangar areas, but specific sources have not been determined.

Previous Investigations

Several investigations of groundwater contamination in the vicinity of Old Roosevelt Field have been conducted. The primary results can be found in the Roosevelt Field Contaminated Groundwater Area Site Quality Assurance Project Plan

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WASTE TYPES: ☒ Liquid ☐ Solid ☐ Sludge ☐ Gas ☐ Unknown ☐ Other, specify:WASTE CHARACTERISTICS: *Check as many as applicable.*☐ Corrosive ☒ Flammable ☐ Radioactive☐ Toxic ☒ Volatile ☐ Reactive☐ Inert Gas ☐ Unknown☐ Other: _____**WORK ZONES:**

The exclusion zone (EZ) includes all active areas in which contaminants may affect personnel through exposure routes, and /or in which heavy equipment and other hazardous materials may be used. The contamination reduction/ decontamination zone (CRZ) is the transition area between the EZ and the support zone (SZ). These zones will be established such that the wind direction is from the SZ to the EZ. the buddy system will be in effect at all times.

HAZARDS OF CONCERN: *Check as many as applicable.*☒ Heat Stress CDM Guideline ☒ Noise CDM Guideline☒ Cold Stress CDM Guideline ☒ Inorganic Chemicals☒ Explosive/Flammable ☒ Organic Chemicals☐ Oxygen Deficient ☒ Motorized Traffic☐ Radiological ☒ Heavy Machinery☐ Biological ☒ Slips & Falls CDM Guideline☐ Other:☐ Other:**FACILITY'S PAST AND PRESENT DISPOSAL METHODS
AND PRACTICES:**

The US Military, particularly the Air Force, (former occupant of the site) poured solvents, including TCE onto the ground at all of their bases. Standard maintenance at almost every air force base involved spraying planes liberally with solvents to clean and de-ice them.

This plan incorporates CDM's procedure for:

HousekeepingHazardous Waste Site DecontaminationFlammable and Combustible LiquidsTraffic and Work Zone SafetyWorking Around Heavy EquipmentCompressed GasesWorking Safely Around Drill RigsHazardous Waste Site Controls

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DESCRIPTION AND FEATURES:

The site currently consists of a large shopping mall, numerous restaurants, a movie theater, and office buildings which ring the shopping mall. Most of the open space at the site is parking areas serving the shopping mall and office buildings. The western portion of the site contains the Village of Garden City water supply wells, two recharge basins and a small strip of open space just east of Clinton Road. The Garden City supply wells are currently active, pumping approximately 1.4 million gallons per day. All groundwater from the two wells is treated on-site by dedicated air strippers. All of the cooling water wells have either been abandoned or taken out of service.

The Roosevelt site is flat to gently undulating. According to the USGS Freeport 1:24,000 topographic quadrangle, the site slopes from approximately 100 feet above msl at the northern edge of the site (along Old Country Road) down to approximately 70 feet above msl at the Village of Hempstead public water supply wells, located about 4,000 feet south-southwest of Roosevelt Field, along Clinton Road.

Surface rainwater runoff is routed into stormwater collection systems and commonly is discharged directly to either dry wells or recharge/detention basins. The Pembroke recharge basin and two Nassau County recharge basins are three man-made water table recharge basins located onsite. One of the Nassau County basins is located approximately 1,500 feet southwest of the Roosevelt Field Shopping Center; the other county recharge basin is located about 1,000 feet southeast of the shopping center. The privately-owned Pembroke Basin appears to receive surface water runoff during storm events. The Nassau County basins receive storm runoff from the municipal stormwater collection system.

SURROUNDING POPULATION:

(X) Residential () Industrial (X) Commercial () Rural () Urban OTHER:

HAZARDOUS MATERIAL SUMMARY:*Highlight or bold waste types and estimate amounts by category.*

CHEMICALS: <i>Amount/Units:</i>	SOLIDS: <i>Amount/Units:</i>	SLUDGES: <i>Amount/Units:</i>	SOLVENTS: <i>Amount/Units:</i>	OILS: <i>Amount/Units:</i>	OTHER: <i>Amount/Units:</i>
Acids	Flyash	Paints	Ketones	Oily Wastes	Laboratory
Pickling Liquors	Mill or Mine Tailings	Pigments	Aromatics	Gasoline	Pharmaceutical
Caustics	Asbestos	Metals Sludges	Hydrocarbons	Diesel Oil	Hospital
Pesticides	Ferrous Smelter	POTW Sludge	Alcohols	Lubricants	Radiological
Dyes or Inks	Non-Ferrous Smelter	Distillation Bottoms	Halogenated (chloro, bromo)	Polynuclear Aromatics	Municipal
Cyanides	Metals	Aluminum	Esters	PCBs	Construction
Phenols	Dioxins		Ethers	Heating Oil	Munitions
Halogens					
Other - <i>specify</i>	Other - <i>specify</i>	Other - <i>specify</i>	Other - Chlorinated Solvents: TCE, PCE, 1,2 - DCE, carbon tetrachloride	Other - Unknown	Other - <i>specify</i>

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KNOWN CONTAMINANTS	Media	HIGHEST OBSERVED CONCENTRATION	PEL/TLV ppm	IDLH ppm	SYMPTOMS & EFFECTS OF ACUTE EXPOSURE	PHOTO IONIZATION POTENTIAL (eV)
Tetrachloroethylene (PCE)	water	41,000 ppb	25 ppm	Ca [150 ppm]	Irritated eyes, nose, throat, flushed face & neck, dizziness	9.32
Trichloroethylene (TCE)	water	38,000 ppb	50 ppm	Ca [1,000 ppm]	Visual disturbance, headache, drowsiness	9.45
1,2 Dichloroethylene (1,2-DCE)		2,800 ppb	200 ppm	Ca [1,000 ppm]	Irritated eyes, Central nervous system depression	9.65

NA = Not Available

NE = None Established

U = Unknown

Verify your access to an MSDS for each chemical
you will use at the site.

S = Soil
A = Air
SW = Surface Water
ppb= parts per billion

GW = Ground Water
Ca=Occupational Carcinogen
ppm=parts per million.

IDLH'=Immediately Dangerous to Life or Health

eV=Electron Volt
PEL= Permissible Exposure Limits
TLV= Threshold Limit Value

SD = Sediment
OFF = Off-Site

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SPECIFIC TASK DESCRIPTIONS	Disturbing the Waste?	TASK - SPECIFIC HAZARDS	HAZARD & SCHEDULE		
1 Groundwater sampling of existing monitoring wells and Garden City supply wells	Intrusive	slips and falls, organic chemicals	Low Hazard March 2005		
2 Vertical profile groundwater screening	Intrusive	heavy machinery, slips and falls, noise, inorganic chemicals, organic chemicals	Low Hazard August and November 2005		
3 Installation of multiport monitoring wells	Intrusive	heavy machinery, slips and falls, noise	Low Hazard April 2005		
4 Vapor sampling beneath concrete basements	Intrusive	slips and falls, heavy machinery, noise	Low Hazard May 2005		
5 Multiport monitoring well sampling	Intrusive	slips and falls, organic chemicals	Low Hazard August and November 2005		
6 Site Visits, cultural survey, geophysical survey, topographic survey	Non-intrusive	slips and falls, motorized traffic	Low Hazard June 2005		
7 Soil gas survey and sampling	Intrusive	slips and falls, organic chemicals, heavy machinery, noise	Low Hazard June and July 2005		
SPECIALIZED TRAINING REQUIRED: Multiport well installation training to be provided by manufacturer		SPECIAL MEDICAL SURVEILLANCE REQUIREMENTS:			
OVERALL HAZARD EVALUATION: <input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low <input type="checkbox"/> Unknown					
JUSTIFICATION: The highest observed concentrations at the site are below the PEL and the IDHL, therefore the overall hazard is Low. <i>Note: The Site H&S Officer in conjunction with the H&S Manager has the authority to upgrade or downgrade the level of PPE.</i>					
FIRE/EXPLOSION POTENTIAL: <input type="checkbox"/> High <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low <input type="checkbox"/> Unknown					

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PROTECTIVE EQUIPMENT:

Specify by task. Indicate type and/or material, as necessary. Group tasks if possible. Use copies of this sheet if needed.

BLOCK A		BLOCK B	
TASKS: 1-4-5 LEVEL: D Primary	Respiratory: (X) Not needed () SCBA, Airline: () APR: () Cartridge: () Escape Mask: () Other: Head and Eye: () Not needed (X) Safety Glasses: () Face Shield: () Goggles: () Hard Hat () Other: Boots: () Not needed (X) Steel-Toe (X) Steel Shank () Rubber () Leather () Overboots:	Prot. Clothing: () Not needed () Encapsulated Suit: () Splash Suit () Apron: (X) Tyvek Coverall or () Saranex Coverall () Cloth Coverall: () Other: Gloves: () Not needed () Undergloves: (X) Gloves: Nitrile () Overgloves: Other: specify below () Tick Spray () Flotation Device If Over Water (X) Hearing Protection (X) Sun Screen	Respiratory: () Not needed () SCBA, Airline: (X) APR: MSA Full Face (X) Cartridge: GMC-H () Escape Mask: () Other: Head and Eye: () Not needed () Safety Glasses: () Face Shield: () Goggles: (X) Hard Hat: () Other: Boots: () Not needed (X) Steel-Toe () Steel Shank () Rubber (X) Leather () Overboots: Latex
	Prot. Clothing: () Not needed () Encapsulated Suit: () Splash Suit () Apron: (X) Tyvek Coverall or () Saranex Coverall () Cloth Coverall: () Other: Gloves: () Not needed: (X) Undergloves: latex () Gloves: (X) Overgloves: Nitrile Other: specify below () Tick Spray () Float. Device If Over Water (X) Hearing Protection (X) Sun Screen		
TASKS: 6 LEVEL: D-Modified Primary	Respiratory: (X) Not needed () SCBA, Airline: () APR: () Cartridge: () Escape Mask: () Other: Head and Eye: () Not needed (X) Safety Glasses: () Face Shield: () Goggles: () Hard Hat: () Other: Boots: () Not needed (X) Steel-Toe () Steel Shank () Rubber (X) Leather () Overboots:	Prot. Clothing: (X) Not needed () Encapsulated Suit: () Splash Suit () Apron: () Tyvek Coverall () Saranex Coverall () Cloth Coverall: () Other: Gloves: () Not needed () Undergloves: (X) Gloves: nitrile () Overgloves: Other: specify below () Tick Spray () Flotation Device (X) Hearing Protection (X) Sun Screen	Respiratory: () Not needed () SCBA, Airline: (X) APR: MSA Full Face (X) Cartridge: GMC-H () Escape Mask: () Other: Head and Eye: () Not needed () Safety Glasses: () Face Shield: () Goggles: (X) Hard Hat: () Other: Boots: () Not needed (X) Steel-Toe (X) Steel Shank () Rubber (X) Leather () Overboots: Latex
	Prot. Clothing: () Not needed () Encapsulated Suit: () Splash Suit () Apron: (X) Tyvek Coverall or () Saranex Coverall () Cloth Coverall: () Other: Gloves: () Not needed (X) Undergloves: latex () Gloves: (X) Overgloves: Nitrile Other: specify below () Tick Spray () Float. Device If Over Water (X) Hearing Protection (X) Sun Screen		

This health and safety plan form constitutes hazard analysis per 29 CFR 1910.132

HEALTH AND SAFETY PLAN FORM

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CDM**CDM Health and Safety Program****PROJECT DOCUMENT #:****3223-146-PP-HASP-05181**

PROTECTIVE EQUIPMENT: *Specify by task. Indicate type and/or material, as necessary. Group tasks if possible. Use copies of this sheet if needed.*

BLOCK E

Respiratory: (X) Not needed

() SCBA, Airline:

() APR:

() Cartridge:

() Escape Mask:

() Other:

Head and Eye: () Not needed

(X) Safety Glasses:

() Face Shield:

() Goggles:

(X) Hard Hat:

() Other:

Boots: () Not needed

(X) Steel-Toe (X) Steel Shank

() Rubber () Leather

() Overboots:

Prot. Clothing: () Not needed

() Encapsulated Suit:

() Splash Suit

() Apron:

() Tyvek Coverall or - as needed

() Saranex Coverall

() Cloth Coverall:

() Other:

Gloves: () Not needed

() Undergloves:

(X) Gloves: Nitrile

() Overgloves:

Other: specify below

() Tick Spray

() Flotation Device If Over Water

(X) Hearing Protection

(X) Sun Screen

BLOCK F

Respiratory: () Not needed

() SCBA, Airline:

(X) APR: MSA Full Face

(X) Cartridge: GMC-H

() Escape Mask:

() Other:

Head and Eye: () Not needed

(X) Safety Glasses:

() Face Shield:

() Goggles:

(X) Hard Hat:

() Other:

Boots: () Not needed

(X) Steel-Toe (X) Steel Shank

() Rubber (X) Leather

() Overboots: Latex

Prot. Clothing: () Not needed

() Encapsulated Suit:

() Splash Suit

() Apron:

(X) Tyvek Coverall or

() Saranex Coverall

() Cloth Coverall:

() Other:

Gloves: () Not needed

(X) Undergloves: latex

() Gloves:

(X) Overgloves: Nitrile

Other: specify below

() Tick Spray

() Float. Device If Over Water

(X) Hearing Protection

(X) Sun Screen

TASK: 2-3-7

LEVEL: D

Primary

TASKS: 2-3-7

LEVEL: C

Contingency

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MONITORING EQUIPMENT: *Specify by task. Indicate type as necessary. Attach additional sheets if needed.*

INSTRUMENT TASK		ACTION GUIDELINES	COMMENTS
Photoionization Detector 11.7 eV Lamp Type: MiniRAE 2000	1-2-3-4-5-6-7	0-5 ppm <i>Background, continue monitoring</i>	() Not Needed
		5-25ppm <i>Evacuate area, call Health and Safety Coordinator, upgrade to level C</i>	
		>25ppm <i>Stop work, evacuate area, initiate Community Air Monitoring Program (see contingency plan- page 12)</i>	
Combustible Gas Indicator 2-3-4-7		0-10% LEL <i>No explosion hazard</i>	() Not Needed
		10-25% LEL <i>Potential explosion hazard; notify SHSC</i>	
		>25% LEL <i>Explosion hazard; interrupt task/evacuate</i>	
		21.0% O ₂ <i>Oxygen normal</i>	
		<21.0% O ₂ <i>Oxygen deficient; notify SHSC</i>	
Radiation Survey Meter		<19.5% O ₂ <i>Interrupt task/evacuate</i>	(X) Not Needed
		3 x Background: <i>Notify HSM</i>	
Flame Ionization Detector Type		>2mR/hr: <i>Establish Radiation EZ</i>	(X) Not Needed
		<i>Specify:</i>	
Single Gas Type			(X) Not Needed
		<i>Specify:</i>	
Respirable Dust Monitor Type_Observation_ Type			() Not Needed
		<i>Dust monitoring will occur if CDM staff feels work zone monitoring is warranted. If exceeds 2.5mg/m³ (TWA) CDM staff will don respiratory equipment and exit site.</i>	
Other Specify: Type			(X) Not Needed
		<i>Specify:</i>	
Other Specify: Type			(X) Not Needed
		<i>Specify:</i>	

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DECONTAMINATION PROCEDURES**ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES AS PAGE TWO****Personnel Decontamination**

Respirators will be selected, used, decontaminated, and stored in accordance with the CDM Health and Safety Manual, as based on OSHA 1910.134. The personal decontamination station will move from location to location based on work site. Wash hands and face if necessary with soap and water upon doffing personal protective equipment. Wash well before hand-to-mouth contact is made. Workers will remove protective clothing in this order:

- equipment drop
- boot covers
- outer gloves
- hard hat
- respirator (if used)
- Tyvek
- inner gloves
- face and hand wash

WASH HANDS AND FACE PRIOR TO ANY
INGESTION OF FOOD OR LIQUIDS

Sampling Equipment Decontamination

All Sampling equipment will be thoroughly decontaminated as follows:

- 1) Wash and scrub with low phosphate detergent
- 2) Potable tap water rinse*
- 3) Rinse with 10% nitric acid, ultrapure (1% for carbon steel implements) when sampling for inorganics
- 4) Deionized water rinse
- 5) Acetone rinse (pesticide grade or better) when sampling for organics
- 6) Thorough rinse with deionized, demonstrated analyte-free water (at least five times the amount of solvent used in step 5)
- 7) Air dry
- 8) Wrap in aluminum foil for transport

* Potable water must be from a municipal water treatment supply system

Phthalate-free gloves must be worn when using solvents. Water quality measurement probes must be rinsed with deionized water between uses. Water level indicator tape must be rinsed/ wiped with wet paper towel between uses.

Heavy Equipment Decontamination

Prior to removal from the work site, potential contaminated soil will be scraped or brushed from exterior surfaces.

The drill rig and all downhole equipment such as augurs, and any other large equipment in the extraction zone will be steam cleaned.

Containment and Disposal Method

PPE wastes will be containerized in 55 gallon drums and held for appropriate disposal off-site.

Containment and Disposal Method

Decontamination wastes will be containerized in 55 gallon drums and held for appropriate disposal off-site.

Containment and Disposal Method

Decontamination wastes will be containerized by the driller in 55 gallon drums and held for appropriate disposal off-site.

HAZARDOUS MATERIALS TO BE BROUGHT ONSITE

Preservatives		Decontamination		Calibration	
(X) Hydrochloric Acid	() Zinc Acetate	(X) Alconox™	() Hexane	(X) 100 ppm isobutylene	() Hydrogen Sulfide
(X) Nitric Acid	() Ascorbic Acid	() Liquinox™	() Isopropanol	() Methane	() Carbon Monoxide
(X) Sulfuric Acid	() Acetic Acid	(X) Acetone	(X) Nitric Acid	(X) Pentane	(X) pH Standards
(X) Sodium Hydroxide	() Other:	() Methanol	() Other:	() Hydrogen	(X) Conductivity Std
		() Mineral Spirits		() Propane	() Other:

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CDM**CDM Health and Safety Program****PROJECT DOCUMENT #:****3223-146-PP-HASP-05181****EMERGENCY CONTACTS**

Water Supply 516/ 465-4020
Site Telephone
EPA Release Report #: 800 / 424 - 8802
CDM 24-Hour Emergency #: 703 / 754 - 0700 or 571-216-7004
Facility Management
Other (specify)
CHEMTREC Emergency #: 800 / 424 - 9300

CONTINGENCY PLANS: *Summarize below*

Evacuate site if any unexpected hazardous conditions are encountered. If staff observe hazards for which they have not been prepared, they will withdraw from the area and call CDM Federal Health & Safety Manager, Chuck Myers. Solo CDM representatives will not enter or remain in an area unless accompanied by client or facility personnel. Without regard to monitoring instrument reading, CDM personnel will leave site and upgrade their level of protection if they experience nausea or dizziness.

Community Air Monitoring Program:

■ If ambient air concentrations of total VOCs exceeds 5 parts per million (ppm) above background, work activities will be temporarily halted until VOC-levels drop below 5 ppm above background.

■ If total VOCs persist at levels in excess of 5 ppm over background but less than 25 ppm, the source of vapors will be identified and corrective actions taken to abate emissions. After this step, work activities can resume if the total VOC vapor level 200 feet downwind of the exclusion zone (or half the distance to the nearest potential receptor) is below 5 ppm over background.

■ If organic vapor levels exceed 25 ppm at the perimeter of the work area, activities will be shut down.

In the event of an emergency, all employees will evacuate the area and meet adjacent to the CDM office trailer.

EMERGENCY CONTACT:**NAME****PHONE**

Health and Safety Manager	Chuck Myers	703-968- 0900
Project Manager	Susan Schofield	203-262-6633
Site Safety Coordinator	Lisa Campbell	212-785-9123
Client Contact	Caroline Kwan	212-637-4275
Other (specify)		
Environmental Agency		
State Spill Number	New York	(800) 342-9296
Fire Department	Garden City	911/ 516-746-1301
Police Department	Garden City	911/ 516/742-1211
State Police		911
Health Department	Nassau County	516-571-3410
Poison Control Center	Nationwide	800-222-1222
Occupational Physician	Kenneth Chase	800-777-WOHA

MEDICAL EMERGENCY**PHONE**

Hospital Name: Winthrop University Hospital 516-663-0333
Hospital Address 259 1st Street, Mineola, NY
Name of Contact at Hospital:
Name of 24-Hour Ambulance:

Route to Hospital:

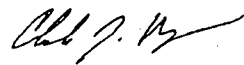
Take Clinton Road North. Make a left onto Old Country Road. Drive Drive about 1.2 miles and make a right onto Franklin Avenue/ Mineola Boulevard. Travel approximately 4 blocks and make a left onto 1st Street. The hospital is 2 1/2 blocks down. (SEE ATTACHED MAP)

Distance to Hospital 2 miles

HEALTH AND SAFETY PLAN APPROVALS (H&S Mgr must sign each plan)

Prepared by Antoinette Quagliata Date May 11, 2005

HSM Signature

Date May 11, 2005

DSHC Signature

Date

June 1, 2005

HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

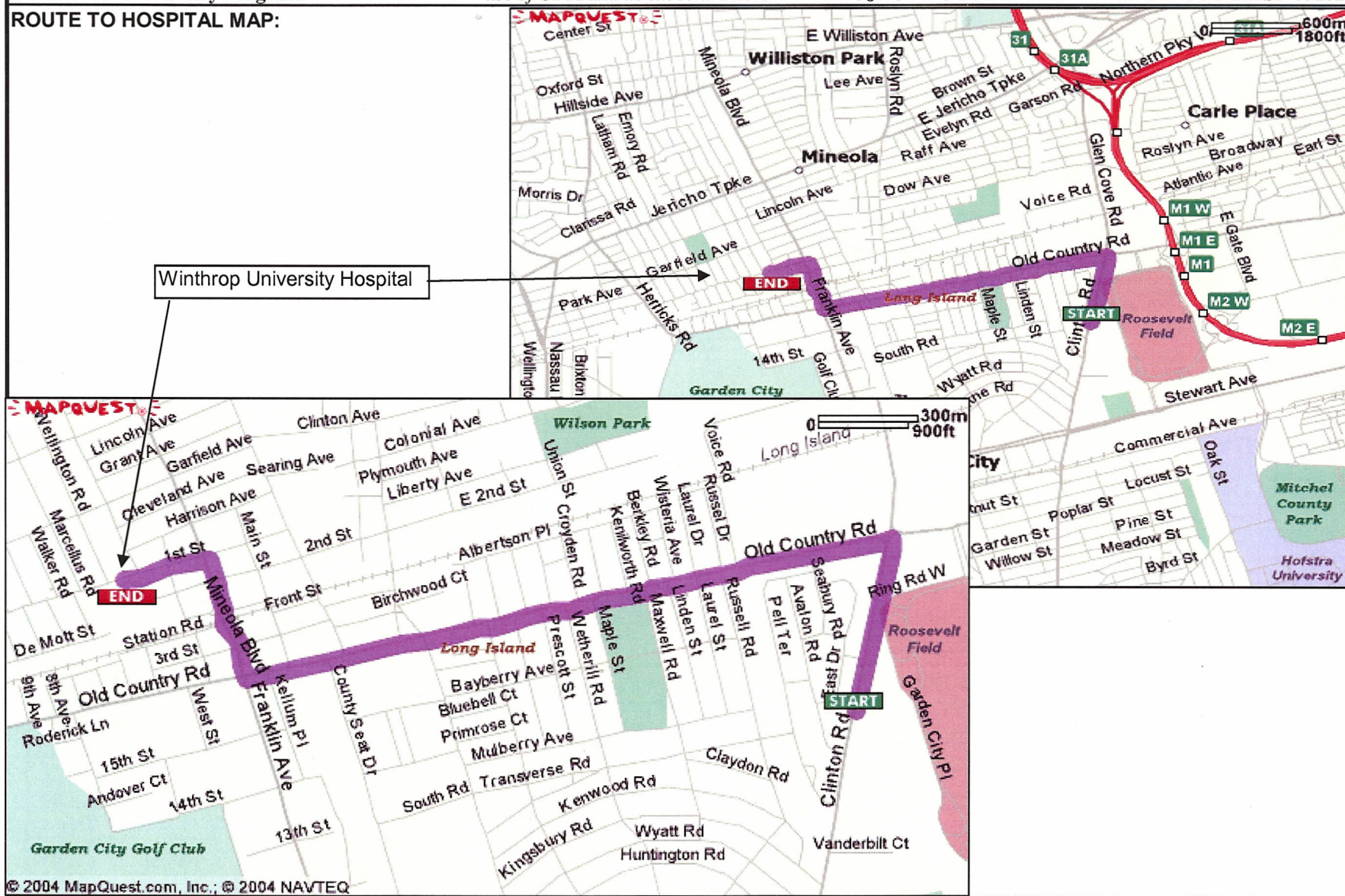
This document is for the exclusive
use of CDM and its subcontractors

CDM

PROJECT DOCUMENT #:

3223-146-PP-HASP-05181

ROUTE TO HOSPITAL MAP:



300635

HEALTH AND SAFETY PLAN SIGNATURE FORM

CDM Health and Safety Plan

All site personnel must sign this form indicating receipt of the H&SP. Keep this original on site. It becomes part of the permanent project files. Send a copy to the Health and Safety Manager (HSM).

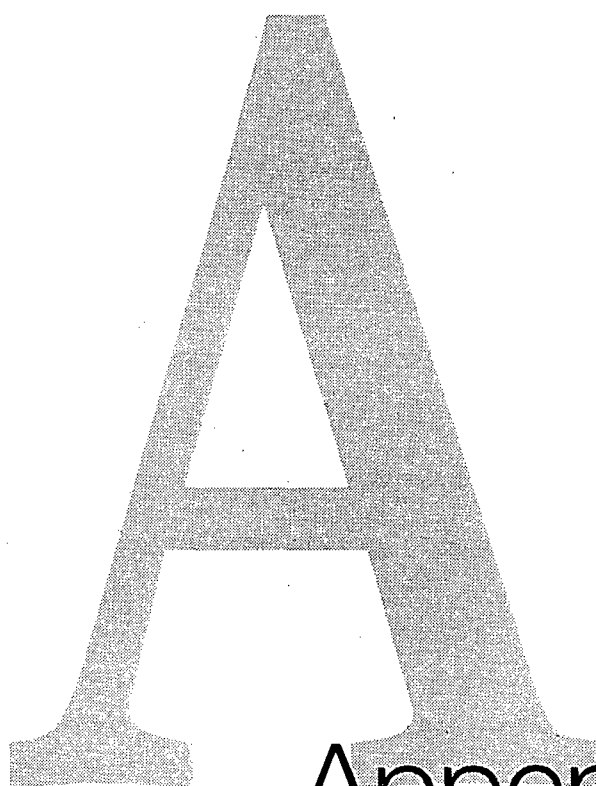
SITE NAME/NUMBER: Old Roosevelt Field Contaminated Groundwater Area Site/ 3223-146

DIVISION/LOCATION: Garden City, NY

CERTIFICATION:

I understand, and agree to comply with, the provisions of the above referenced H&SP for work activities on this project. I agree to report any injuries, illnesses or exposure incidents to the site Health and Safety Coordinator (SHSC). I agree to inform the SHSC about any drugs (legal and illegal) that I take within three days of site work.

PRINTED NAME	SIGNATURE	DATE



Appendix A

APPENDIX A
ACTIVITY HAZARD ANALYSIS

ACTIVITY HAZARD ANALYSIS

This Activity Hazard Analysis includes the additional potential hazard of working at night at the Old Roosevelt Field Contaminated Groundwater Site.

[1] AHA No.: 3223-146-01			
[2] Work Location: Garden City, New York			
[3] Task Title: Remedial Investigation Field Activity			
[4] Work Phase:		[5] List Work Groups Needed for Each Phase	
A. Drilling, and well installation		A. Rig Crew (Project Geologist, Drillers, and Samplers)	
B. Monitoring Well Sampling, Topographic and Geophysical Survey, Cultural Resources Survey, Soil gas survey and sampling		B. Environmental Samplers, Subcontract Personnel	
This AHA shall be reviewed annually or as requested by the workers, supervisors, and/ or safety representatives			
[6] Activity Steps	[7] Work Groups	[8] Hazards	[9] Hazard Controls (Engineered, Operational, Documents, PPE, Qualifications)
Site Visit	Field Team Leader, Project Manager, etc.	General	<ul style="list-style-type: none"> All work areas will be clearly marked with flags and warning signs Visitors must report to trailer, Site Health and Safety Officer, or Field Team Leader upon arrival.
Drilling and well installation	Rig Crew	Contamination	<ul style="list-style-type: none"> At a minimum, plastic will be placed over the area to be drilled. If the contaminants warrant, plastic will be placed under the rig as well as a large area surrounding the rig. If fuel or oil leaks on the plastic sheeting, absorbent pads will be used.
		Housekeeping – slips/trips/falls	<ul style="list-style-type: none"> All sites will be kept clean and free of trash and other debris. All trash will be properly containerized and removed or staged daily.
		Equipment Inspection	<ul style="list-style-type: none"> Prior to use all drill rigs and related equipment will be inspected by health and safety and the site geologist or designate. Drill rigs and support equipment will be inspected daily and documented by the equipment operator.

ACTIVITY HAZARD ANALYSIS

Drilling, and well installation (continued)	Drill rig failure	<ul style="list-style-type: none"> • The mast and cables must be able to support all equipment and drill rods. • Wire cables must be maintained in good condition, free from kinks or broken strands. • All rotating shafts, pulleys or chains must be covered with protective guards. • All drill rigs must be equipped with an emergency kill switch, which is readily accessible to personnel at the rear of the rig. All personnel on the site will know the location of the kill switch and how to use it.
	Water tanks	<ul style="list-style-type: none"> • All water tanks must be securely fastened to the truck frame. • Water tanks should be constructed of materials with adequate side strength, baffled to prevent the sloshing of water side to side, and must have lids with gaskets to prevent water loss.
	Back Injuries	<ul style="list-style-type: none"> • Employees will use proper lifting techniques: bend at knees and grip objects with whole hand, keep back as straight and vertical as possible, center body weight over feet, arms and elbows kept close to the body, heavy or large objects shall be carried by two people • Ensure pathways are clear
	Eye injury	<ul style="list-style-type: none"> • Safety glasses will be required during drilling operations
	Foot injury	<ul style="list-style-type: none"> • Leather steel-toes boots will be required.
	Hearing loss	<ul style="list-style-type: none"> • Hearing protection will be required during hammering operations. • Sound level readings will be taken during the initial startup of the operation to determine the hearing protection buffer zone, if a zone is necessary.
	Hand injury	<ul style="list-style-type: none"> • Gloves will be worn during routine drilling activities. • Keep hands away from mud rotary driller, the hammer, and all other moving parts.
	Head injury	<ul style="list-style-type: none"> • Hard hats will be required during drilling operations. • Hard hats will not be required during site set up, but will be required once the mast has been raised.

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ACTIVITY HAZARD ANALYSIS

Drilling and well installation (continued)		Unauthorized operation	<ul style="list-style-type: none"> Only trained and authorized personnel will operate and/or assist in drilling operations. Operators must comply with all applicable state certifications.
		Crushing injuries	<ul style="list-style-type: none"> Drill rigs and drill bit stabilizer will be properly transported by either a rack, the rig, or utility trailer. If transported on a trailer, the rods or stabilizers will be held securely in place. If feasible, all vehicles and wheeled equipment will have chocks placed under the wheels to prevent rolling.
		Rig/equipment damage	<ul style="list-style-type: none"> Wire cables will be inspected daily. Cables with broken strands, weak spots, kinking, or mashed areas will be replaced prior to use.
		Fire prevention	<ul style="list-style-type: none"> Drill rigs will contain at least one ABC type fire extinguisher. Fire extinguishers will be fully charged and inspected weekly. Fuels will be stored in appropriate containers.
		Severe weather	<ul style="list-style-type: none"> Drilling will stop when rain interferes with the safety of the operators. Drilling activities will stop during lightning. Operators, crew, and other support personnel will move out of the exclusion zone and take shelter in other vehicles.
		Power lines/ underground utilities	<ul style="list-style-type: none"> Ensure that there are not any power lines or underground utilities prior to drilling activities. If work is near an overhead line, care will be taken to ensure there is clearance with raising the mast. While working near power lines, drill rods will not be leaned against the mast. If the drill bit encounters anything hard, drilling will stop and the geologist will be notified.
Decontamination Using a Steam Cleaner	Rig Crew	Hand Injury	<ul style="list-style-type: none"> Skid mounted steam cleaners will have protective guarding on all rotating shafts, belts, and pulleys. Nitrile gloves will be worn while operating the steam cleaner. Keep hands clear of the water spray.
		Hearing loss	<ul style="list-style-type: none"> Hearing protection will be worn during steam cleaning operation.

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ACTIVITY HAZARD ANALYSIS

Decontamination Using a Steam Cleaner		Fire	<ul style="list-style-type: none"> • Turn off the steam cleaner and allow it to cool before refueling. • Generators will be turned off while being refueled • Smoking is prohibited during refueling operation
		Electrical	<ul style="list-style-type: none"> • If steam cleaners are being powered by a generator, a Ground-Fault Circuit Interrupter (GFCI) will be required.
Monitoring Well Sampling, and Topographic and Geophysical Survey, Soil gas survey and sampling	Environmental Samplers	Environmental protection	<ul style="list-style-type: none"> • At a minimum, plastic will be placed over the area to be sampled.
		Housekeeping - slips/trips/falls	<ul style="list-style-type: none"> • All sites will be kept clean and free of trash and other debris. • All trash will be properly containerized and removed or staged daily.
		Equipment Inspection	<ul style="list-style-type: none"> • Prior to use, all equipment will be inspected by health and safety and the site geologist or designate.
		Eye injury	<ul style="list-style-type: none"> • Safety glasses will be required during sampling operations
		Foot injury	<ul style="list-style-type: none"> • Leather steel-toes boots will be required.
		Hand injury	<ul style="list-style-type: none"> • Gloves will be worn during routine sampling activities. • Keep hands away from all moving parts.
		Unauthorized operation	<ul style="list-style-type: none"> • Only trained and authorized personnel will operate and/or assist in sampling operations
		Slips/ trips	<ul style="list-style-type: none"> • Slippery conditions will be avoided
		Fire Prevention	<ul style="list-style-type: none"> • Vehicles will contain at least one ABC type fire extinguisher • Fire extinguishers will be fully charged and inspected weekly. • Fuels will be stored in appropriate containers
		Severe weather	<ul style="list-style-type: none"> • Sampling will stop when rain interferes with the safety of the operators. • Sampling activities will stop during lightning. • Samplers and other support personnel will move out of the exclusion zone and take shelter in other vehicles.
		Head Injury	<ul style="list-style-type: none"> • Hard hats will be required drilling operations

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ACTIVITY HAZARD ANALYSIS

[10] Attachments:			
Document Type	Document Number	Applies to Work Group	For Work Step(s)/Phase(s)
Comments:			
[11] References:			
Document Type	Document Number	Applies to Work Group	For Work Step(s)/Phase(s)
CDM Federal's Health and Safety Program Manual	NA (dated September 2003)	All	All
Roosevelt Field Contaminated Groundwater Area Site Health and Safety Plan	3220-046-PP-HASP-05181 January 21, 2005	All	All
Roosevelt Field Contaminated Groundwater Area Site Quality Assurance Project Plan		All	All

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ACTIVITY HAZARD ANALYSIS

[12] Subcontractor Approvals		a. Print Name	b. Signature	c. Date
1	Environmental, Safety, and Health			
2	Site Supervisor			
[13] Change Summary				
[6] Activity Steps	[7] Work Groups	[8] Hazards	[9] Hazard Controls (Engineered, Operational, Documents, PPE, Qualifications)	
[14] Subcontractor Approvals		a. Print Name	b. Signature	c. Date
1	Environmental, Safety, and Health			
2	Site Supervisor			

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PRE-JOB BRIEFING ATTENDANCE

300645

B

Appendix
B

APPENDIX B
OSHA POSTER

You Have a Right to a Safe and Healthful Workplace. **IT'S THE LAW!**

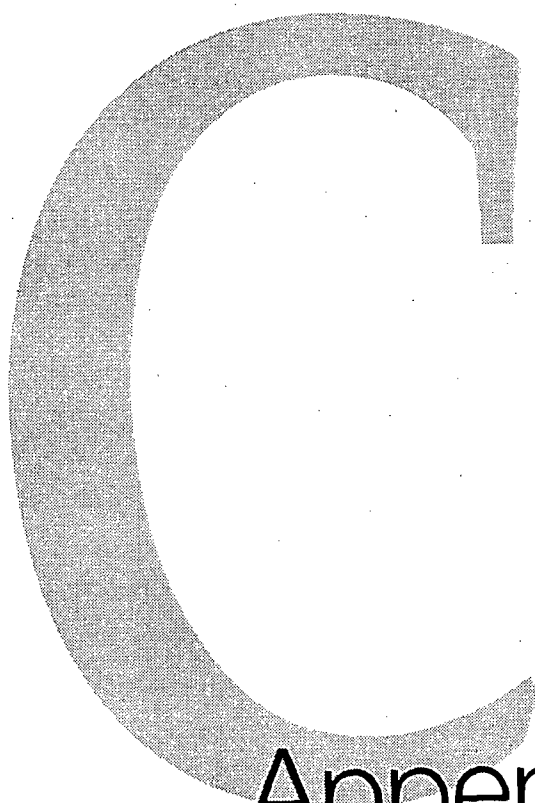
- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in the inspection.
- You can file a complaint with OSHA within 30 days of discrimination by your employer for making safety and health complaints or for exercising your rights under the OSH Act.
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.



The *Occupational Safety and Health Act of 1970 (OSH Act)*, P.L. 91-596, assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration, in the U.S. Department of Labor, has the primary responsibility for administering the *OSH Act*. The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, call 1-800-321-OSHA or your nearest OSHA office: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Kansas City (816) 426-5861 • New York (212) 337-2378 • Philadelphia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. Teletypewriter (TTY) number is 1-877-889-5627. To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website at www.osha.gov. If your workplace is in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

1-800-321-OSHA www.osha.gov

U.S. Department of Labor • Occupational Safety and Health Administration • OSHA 3165



Appendix C

APPENDIX C
INJURY ILLNESS REPORT FORM

CDM Federal Injury/Illness Report

Information about Injured, Ill, or Involved Employee

First Name: _____ Middle Initial: _____

Last Name: _____

SSN: _____ Sex: _____ Age: _____

Employee Number: _____

Employee Status: ☐ CDM Federal ☐ Subcontractor

Name of Subcontractor Firm: _____

Address and Phone No.: _____

Employment Category:

- ☐ Regular Full time
- ☐ Regular Part time
- ☐ Temporary
- ☐ Non-employee

Length of Employment:

- ☐ In training ☐ 3-5 years
- ☐ <6 months ☐ 5-10 years
- ☐ 6 mos-1 yr ☐ 10-20 years
- ☐ 1-3 years ☐ 20+ years

Time in Occupation:

- ☐ In training ☐ 3-5 years
- ☐ <6 months ☐ 5-10 years
- ☐ 6 mo-1 yr ☐ 10-20 years
- ☐ 1-3 years ☐ 20+ years

Information about Accident/Injury/Illness

Date of Accident: _____ Time: _____

Specific Location of Accident: _____

Witness(es) to the Accident/Injury: _____

Employee's Usual Occupation: _____

Occupation at Time of Accident: _____

Supervisor: _____

Injury or Illness? ☐ Injury ☐ Illness

Property Damage? ☐ Yes ☐ No

Vehicle Involved? ☐ Yes ☐ No

Injury/Illness Severity:

- ☐ First Aid Only
- ☐ Medical Treatment
- ☐ Lost Workdays - Restricted Activity
- ☐ Lost Workdays - Away from Work
- ☐ Fatality Date: _____
- ☐ Total Number of Lost Days: _____

OSHA Illness Code:

- ☐ Occupational Skin Diseases or Disorders
- ☐ Dust Diseases of the Lungs
- ☐ Respiratory Conditions Due to Toxic Agents
- ☐ Poisoning
- ☐ Disorders Due to Physical Agents
- ☐ Disorders Associated with Repeated Trauma
- ☐ All other Occupational Illnesses

Phase of Employee's Workday at Time of Injury:

- ☐ Performing Work Duties
- ☐ During Meals
- ☐ During Rest Period
- ☐ Entering or Leaving Workplace
- ☐ Other _____

General Type of Task Being Performed at Time of Injury/Illness: _____

Specific Activity Being Performed at Time of Injury/Illness: _____

Employee Was Working:

- ☐ Alone
- ☐ With a Crew or Fellow Worker
- ☐ Other
- Crew size: _____

Supervision at Time of Accident:

- ☐ Directly Supervised
- ☐ Indirectly Supervised
- ☐ Not Supervised
- ☐ Supervision Not Feasible

Name, Address, and Phone Number of Attending Physician: _____

Name and Address of Hospital: _____

Body Part Affected (circle all that are applicable):

Abdomen	Ear	Head	Multiple	Thigh
Ankle	Elbow	Heart	Musc. Skel.	Toe
Arm	Eye	Hips	Neck	Wrist
Back	Face	Kidneys, Intest.	Nervous Sys.	Other _____
Brain	Finger	Knee	Scalp	Unknown
Chest	Foot	Leg	Shoulder	
Digestive	Hand	Lungs	Skull	

Injury Type (circle all that are applicable):

Amputation	Contusion	Elec. Shock	Heat Stroke	Poisoning
Asphyxia	Crush/Bruise	Fracture	Infect. Disease	Radiation
Burn/Chemical	Cut/Puncture	Freezing	Inflammation	Scratch
Burn/Heat	Dermatitis	Hearing Loss	Multiple	Sprain/Strain
Concussion	Dislocation	Hernia	Occ. Disease	Other _____
				Unknown

Injury Source (circle all that are applicable):

Air Pressure	Clothing	Heat	Noise	Soaps
Animals	Coal/Petroleum	Hoists	Paper	Silica
Animal Product	Cold	Infectious	Particles	Scrap/Debris
Body Motion	Drugs &	Agents	Plants	Steam
Boilers	Medicines	Ladders	Plastics	Textiles
Boxes/	Electricity	Liquids	Power Tools	Vehicles/
Containers	Fire/Smoke	Machines	Power Trans.	Forklifts
Buildings/	Food Products	Molten Metal	Apparatus	Wood
Structures	Furniture	Miner/Metallic	Pumps	Working Surfaces
Ceramics	Glass	Minerals/	Radiating	Other _____
Chemicals	Hand Tool	Nonmetallic	Substances	Unknown

Accident Type Code (circle all that are applicable):

Struck Against	Fall on Same	Rub/Abrasion	Temp. Extremes	Motor Vehicle
Struck By	Level	Bodily Reaction	Radiations/	Other _____
Fall From	Caught In/	Overexertion	Caustics	Unknown
Elevation	Between	Electrocution	Public Transport	

Hazardous Conditions (circle all that are applicable):

Defects in Dress/Apparel	Inadequately	Placement Hazards	Other _____
Environmental Hazards	Guarded Work	Public Hazards	Unknown
Hazardous Procedures	Environment	None	

Accident Part Code (circle all that are applicable):

Parts of Boilers	Parts of Conveyors	Hand Tools	Parts of Vehicles	None
Parts of Buildings	Parts of Hoists	Power Tools	Machines	
Other _____				

Description of Accident: _____

Possible Causes of Accident/Injury/Illness:

Place a check in the box of each factor that applies to this incident.

EQUIPMENT - Was a Hazardous Condition a Contributing Factor?

- ☐ Defect in Equipment/Tools
- ☐ Hazardous Condition Not Recognized
- ☐ Hazardous Condition Not Reported
- ☐ Employee Not Informed/Job Procedure Not Specified
- ☐ No Equipment Inspection Procedure
- ☐ Inspection Procedure Failed to Detect Hazard
- ☐ Correct Equipment/Tools Not Used
- ☐ Correct Equipment Not Available
- ☐ Employee Not Informed of Correct Equipment
- ☐ Substitute Equipment
- ☐ Equipment Design Contributed to Operator Stress/Error
- ☐ Design/Quality of Tool Contributed to Hazardous Condition
- ☐ Other/Unknown _____

ENVIRONMENT - Was the Location/Position of Equipment, Materials, or Employee a Contributing Factor?

- ☐ Location/Position Contributed to a Hazardous Condition
- ☐ Hazardous Condition Not Recognized
- ☐ Hazardous Condition Not Reported
- ☐ Employee Not Informed of Correct Job Procedure for Hazard
- ☐ Employee Did Not Belong in the Area
- ☐ Hazardous Condition Not Visible to Employee
- ☐ Insufficient Workspace
- ☐ Poor Environmental Control
- ☐ Uncontrolled Release of Hazardous Material
- ☐ Other/Unknown _____

PEOPLE - Was the Job Procedure(s) a Contributing Factor?

- ☐ Aggravation of a Pre-existing Condition
- ☐ No Written/Known Procedure
- ☐ Job Procedure Inadequate
- ☐ Employee Not Trained on Proper Job Procedure
- ☐ Employee Deviated from Proper Job Procedure
- ☐ Employee Not Physically/Mentally Capable of Performing Job
- ☐ Job Procedure Too Difficult
- ☐ Job Procedure Encourages Deviation
- ☐ Other/Unknown _____

PERSONAL PROTECTIVE EQUIPMENT

- ☐ Employee not using PPE
- ☐ PPE Not Specified for Task
- ☐ PPE Unavailable
- ☐ Employee Not Advised of PPE
- ☐ Employee Not Properly Trained in PPE
- ☐ PPE Used Incorrectly
- ☐ PPE Inadequate
- ☐ Emergency Equipment Not Specified (Shower, Eyewash, Etc)
- ☐ Emergency Equipment Not Available
- ☐ Emergency Equipment Not Used
- ☐ Emergency Equipment Malfunctioned
- ☐ Other/Unknown _____

MANAGEMENT - Was a Management Defect a Contributing Factor?

- ☐ Supervisor Failed to Detect/Anticipate/Report Hazardous Condition
- ☐ Supervisor Failed to Detect/Correct Deviations from Job Procedure
- ☐ No Supervisor Review of Hazards and Job Procedures
- ☐ Supervisor Responsibility Not Defined/Understood
- ☐ Supervisor Not Trained in Accident Prevention
- ☐ Failure to Initiate Corrective Action for Known Hazard
- ☐ Other/Unknown _____

OCCUPATIONAL HEALTH - Was a Chemical or Physical Agent a Contributing Factor?

Physical Agent:

- ☐ Noise, Vibration
- ☐ Temperature Extremes
- ☐ Ionizing Radiation - X, Gamma, Beta, or Alpha Radiation
- ☐ Non-ionizing Radiation - Microwave, Laser, Ultraviolet, or Radio Frequency
- ☐ Ergonomic - Repetitive Motion Trauma, Inappropriate Lighting, Glare, Incorrect or Insufficient Tooling, Benches, Seating

Chemical Agent:

- ☐ Solvents
- ☐ Acid, Bases
- ☐ Particulates
- ☐ Other Toxic Chemicals

Solvent Name _____
 Acid or Base Name _____
 Particulate Name _____
 Chemical Name _____

Biological Agent:

- ☐ Microorganism
- ☐ Insect
- ☐ Animal/Animal Species _____
- ☐ Allergens

Microorganism _____
 Insect's Name _____
 Allergen Name _____

CORRECTIVE ACTION REQUIRED: _____

Signatures:

Immediate Supervisor _____ Date _____
 H&S Coordinator _____ Date _____
 Performance Center Mgr. _____ Date _____
 Corp. H&S Director _____ Date _____

For Office Use Only:

Case No.'s of Others Injured, Ill, or Involved in the Same Accident:

Case No.:	OSHA Recordable? <input type="checkbox"/> Yes <input type="checkbox"/> No
Region:	Address:
Project No.:	Accident or Diagnosis Date:

Photos Relating to Accident/Injury

(Make copies of this page as necessary.)

Insert photos here.

Witness Statement

(Make copies of this page as necessary.)

Name: _____

Employer: _____

Address: _____

Position/Craft: _____

Phone: _____

This statement is in reference to: _____

Site of accident (job name, location): _____

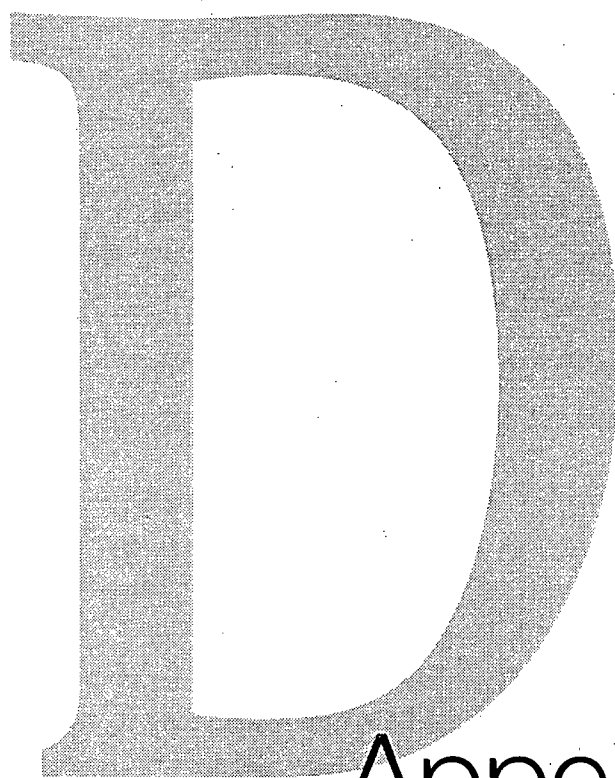
Date of accident: _____

Describe what you know about the accident, what you saw or heard, what you were doing before the accident, what you did after the accident (Use additional pages as necessary):

This statement is true to the best of my knowledge and memory.

Signature _____

Date _____



Appendix D

APPENDIX D
EMPLOYEE MEETING RECORD

Form B

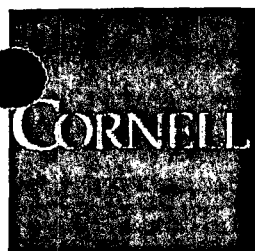
E

Appendix E

APPENDIX E
MSDS SHEETS

Material Safety Data Sheets Included

- Tetrachloroethylene (PCE)
- Trichloroethylene (TCE)
- 1,1-Dichloroethylene (1,2-DCE)
- Carbon Tetrachloride

**Material Safety
Data Sheets**Division of Facilities Services**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only****TETRACHLOROETHYLENE**

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Composition/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

The information in this document is compiled from information maintained by the United States Department of Defense (DOD). Anyone using this information is solely responsible for the accuracy and applicability of this information to a particular use or situation.

Cornell University does not in any way warrant or imply the applicability, viability or use of this information to any person or for use in any situation.

**Section 1 - Product and Company Identification
TETRACHLOROETHYLENE****Product Identification:** TETRACHLOROETHYLENE**Date of MSDS:** 04/06/1989 **Technical Review Date:** 06/12/1992**FSC:** 6810 **NIIN:** 00-819-1128**Submitter:** D DG**Status Code:** C**MFN:** 01**Article:** N**Kit Part:** N**Manufacturer's Information****Manufacturer's Name:** MALLINCKRODT INC SCIENCE PRODUCTS DIVISION

Post Office Box: M
Manufacturer's Address1: PARIS BYPASS
Manufacturer's Address2: PARIS, KY 40361
Manufacturer's Country: US
General Information Telephone: 314-982-5000
Emergency Telephone: 314-982-5000
Emergency Telephone: 314-982-5000
MSDS Preparer's Name: N/P
Proprietary: N
Reviewed: Y
Published: Y
CAGE: 62910
Special Project Code: N

Item Description

Item Name: TETRACHLOROETHYLENE, TECHNICAL
Item Manager: S9G
Specification Number: O-T-236
Type/Grade/Class: GRADE A
Unit of Issue: CN Quantitative Expression: 00000000005GL
Unit of Issue Quantity: 1
Type of Container: CAN

Contractor Information

Contractor's Name: MALLINCKRODT SPECIALTY CHEMICALS CO
Contractor's Address1: 222 RED SCHOOL LANE
Contractor's Address2: PHILLIPSBURG, NJ 08865
Contractor's Telephone: 908-859-2151
Contractor's CAGE: 62910

**Section 2 - Composition/Information on Ingredients
TETRACHLOROETHYLENE**

Ingredient Name: PERCHLOROETHYLENE (TETRACHLOROETHYLENE) (SARA III)
Ingredient CAS Number: 127-18-4 Ingredient CAS Code: M
RTECS Number: KX3850000 RTECS Code: M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: 100
% Environmental Weight:
Other REC Limits: NONE SPECIFIED

OSHA PEL: 100 PPM OSHA PEL Code: M

OSHA STEL: OSHA STEL Code:

ACGIH TLV: 25PPM/100,A3 STEL;94 ACGIH TLV Code: M

ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity: 100 LBS

DOT Reporting Quantity: 100 LBS

Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview TETRACHLOROETHYLENE

Health Hazards Acute & Chronic: ACUTE: MAY CAUSE EYE & SKIN IRRITATION. MAY CAUSE RESPIRATORY TRACT IRRITATION. CENTRAL NERVOUS SYSTEM DEPRESSANT. LOSS OF CONSCIOUSNESS AND EVEN DEATH CAN OCCUR AT HIGH LEVELS OF EXPOSURE. CHRONIC: LIVER AND KIDNEY DAMAGE. ASPIRATION HAZARD DO NOT INDUCE VOMITING. PROBABLE CANCER HAZARD.

Signs & Symptoms of Overexposure:

INCOORDINATION AND IMPAIRED JUDGMENT MAY OCCUR AT VAPOR EXPOSURES FROM 500-1000 PPM; DIZZINESS, DROWSINESS, AND GENERAL ANESTHETIC EFFECTS MAY OCCUR IN RANGES OF 1000 PPM AND HIGHER.

Medical Conditions Aggravated by Exposure:

EYE/SKIN/RESPIRATORY CONDITIONS MAY BE AGGRAVATED BY EXPOSURE. MAY CAUSE CANCER.

LD50 LC50 Mixture: ORAL LD50 (RAT) = 5000 MG/KG

Route of Entry Indicators:

Inhalation: YES

Skin: YES

Ingestion: YES

Carcinogenicity Indicators

NTP: YES

IARC: YES

OSHA: NO

Carcinogenicity Explanation: LISTED AS A CARCINOGEN BY NTP AND IARC.

Section 4 - First Aid Measures TETRACHLOROETHYLENE

First Aid:

INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE CPR. IF BREATHING IS DIFFICULT, GIVE OXYGEN. CALL A PHYSICIAN. EYE: FLUSH IMMEDIATELY WITH LARGE AMOUNTS OF WATER FOR 15 MINUTES. GET MEDICAL ATTENTION. SKIN: REMOVE CONTAMINATED CLOTHING. WASH WITH SOAP AND WATER PROMPTLY. INGESTION: DO NOT INDUCE VOMITING. GIVE MILK OR USP MINERAL OIL. GET IMMEDIATE MEDICAL ATTENTION.

Section 5 - Fire Fighting Measures

TETRACHLOROETHYLENE

Fire Fighting Procedure:

FIRE FIGHTERS SHOULD USE NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT WHEN FIGHTING CHEMICAL FIRE. USE WATER SPRAY TO COOL NEARBY CONTAINERS EXPOSED TO FIRE.

Unusual Fire or Explosion Hazard:

FIRE OR EXCESSIVE HEAT MAY CAUSE PRODUCTION OF HAZARDOUS DECOMPOSITION PRODUCTS INCLUDING PHOSGENE AND HYDROGEN CHLORIDE.

Extinguishing Media:

ANY MEDIA SUITABLE FOR SURROUNDING FIRES.

Flash Point: Flash Point Text: N/R

Autoignition Temperature:

Autoignition Temperature Text: N/R

Lower Limit(s): N/R

Upper Limit(s): N/R

Section 6 - Accidental Release Measures**TETRACHLOROETHYLENE**

Spill Release Procedures:

SMALL SPILL: WIPE UP WITH RAGS OR TOWELS. LARGE SPILLS: WEAR NIOSH APPROVED RESPIRATOR. VENTILATE AREA. DIKE TO RETAIN FLUID. PUMP UP FREE LIQUID. RESIDUE WILL EVAPORATE QUICKLY. DO NOT FLUSH TO SEWER OR WATERWAY.

Section 7 - Handling and Storage**TETRACHLOROETHYLENE**

Handling and Storage Precautions:**Other Precautions:**

Section 8 - Exposure Controls & Personal Protection**TETRACHLOROETHYLENE**

Respiratory Protection:

IN HIGH VAPOR AREA, USE NIOSH APPROVED RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE. USE SELF-CONTAINED BREATHING APPARATUS IF ALLOWABLE VAPOR LEVELS ARE EXCEEDED OR WORKING IN A CONFINED AREA.

Ventilation:

LOCAL EXHAUST RECOMMENDED TO CONTROL VAPORS BELOW 50% OF TLV.

Protective Gloves:

NEOPRENE, PVA GLOVES RECOMMENDED.

Eye Protection: USE CHEMICAL SAFETY GOGGLES.

Other Protective Equipment: APRON AND WORK CLOTHING TO MINIMIZE EXPOSURE. EYE WASH STATION & SAFETY SHOWER RECOMMENDED.

Work Hygienic Practices: WASH THOROUGHLY AFTER USE AND BEFORE EATING, SMOKING OR USING TOILET FACILITIES. DO NOT BREATHE VAPORS OR MIST.

Supplemental Health & Safety Information: TARGET ORGANS ARE SKIN, CNS, CVS, AND EYES.

Section 9 - Physical & Chemical Properties
TETRACHLOROETHYLENE

HCC: T4
NRC/State License Number:
Net Property Weight for Ammo:
Boiling Point: Boiling Point Text: 119F,48C
Melting/Freezing Point: Melting/Freezing Text: N/R
Decomposition Point: Decomposition Text: UNKNOWN
Vapor Pressure: 16 Vapor Density: 5.83
Percent Volatile Organic Content:
Specific Gravity: 1.63
Volatile Organic Content Pounds per Gallon:
pH: N/R
Volatile Organic Content Grams per Liter:
Viscosity: N/P
Evaporation Weight and Reference: 0.27 (CCL4=1)
Solubility in Water: 0.015% BY WT
Appearance and Odor: CLEAR, COLORLESS LIQUID, EHTEREAL ODOR
Percent Volatiles by Volume: 100
Corrosion Rate: UNKNOWN

Section 10 - Stability & Reactivity Data
TETRACHLOROETHYLENE

Stability Indicator: YES
Materials to Avoid:
STRONG OXIDIZERS AND ALKALIS, ACTIVE METALS (SODIUM, POTASSIUM, LITHIUM, ZINC, ALUMINUM, BARIUM ETC.)
Stability Condition to Avoid:
HIGH TEMPERATURES, SPARKS, AND OPEN FLAMES. HIGH PRESSURE ALUMINUM SYSTEMS.
Hazardous Decomposition Products:
DECOMPOSES INTO HIGHLY TOXIC AND IRRITATING HYDROGEN CHLORIDE AND PHOSGENE.
Hazardous Polymerization Indicator: NO
Conditions to Avoid Polymerization:
NOT APPLICABLE

Section 11 - Toxicological Information
TETRACHLOROETHYLENE

Toxicological Information:
N/P

Section 12 - Ecological Information
TETRACHLOROETHYLENE

Ecological Information:
N/P

Section 13 - Disposal Considerations
TETRACHLOROETHYLENE

Waste Disposal Methods:

CLEAN-UP DEBRIS WILL LIKELY BE A LAND-BANNED HAZARDOUS WASTE. DISPOSAL MUST BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

**Section 14 - MSDS Transport Information
TETRACHLOROETHYLENE****Transport Information:**

N/P

**Section 15 - Regulatory Information
TETRACHLOROETHYLENE****SARA Title III Information:**

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:

N/P

**Section 16 - Other Information
TETRACHLOROETHYLENE****Other Information:**

N/P

HMIS Transportation Information**Product Identification:** TETRACHLOROETHYLENE**Transportation ID Number:** 86825**Responsible Party CAGE:** 62910**Date MSDS Prepared:** 04/06/1989**Date MSDS Reviewed:** 06/12/1992**MFN:** 06/12/1992**Submitter:** D DG**Status Code:** C**Container Information****Unit of Issue:** CN**Container Quantity:** 1**Type of Container:** CAN**Net Unit Weight:** 68.0 LBS**Article without MSDS:** N**Technical Entry NOS Shipping Number:****Radioactivity:****Form:****Net Explosive Weight:****Coast Guard Ammunition Code:****Magnetism:** N/P**AF MMAC Code:****DOD Exemption Number:****Limited Quantity Indicator:**

Multiple Kit Number: 0

Kit Indicator: N

Kit Part Indicator: N

Review Indicator: Y

Additional Data:

Department of Transportation Information

DOT Proper Shipping Name: TETRACHLOROETHYLENE

DOT PSN Code: NYB

Symbols:

DOT PSN Modifier:

Hazard Class: 6.1

UN ID Number: UN1897

DOT Packaging Group: III

Label: KEEP AWAY FROM FOOD

Special Provision(s): N36,T1

Packaging Exception: 153

Non Bulk Packaging: 203

Bulk Packaging: 241

Maximum Quantity in Passenger Area: 60 L

Maximum Quantity in Cargo Area: 220 L

Stow in Vessel Requirements: A

Requirements Water/Sp/Other: 40

IMO Detail Information

IMO Proper Shipping Name: TETRACHLOROETHYLENE

IMO PSN Code: OJV

IMO PSN Modifier: P

IMDG Page Number: 6264

UN Number: 1897

UN Hazard Class: 6.1

IMO Packaging Group: III

Subsidiary Risk Label: -

EMS Number: 6.1-02

Medical First Aid Guide Number: 340

IATA Detail Information

IATA Proper Shipping Name: TETRACHLOROETHYLENE

IATA PSN Code: XOW

IATA PSN Modifier:

IATA UN Id Number: 1897

IATA UN Class: 6.1

Subsidiary Risk Class:

UN Packaging Group: III

IATA Label: TOXIC

Packaging Note for Passengers: 605

Maximum Quantity for Passengers: 60L

Packaging Note for Cargo: 612

Maximum Quantity for Cargo: 220L

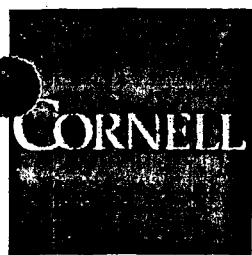
Exceptions:

AFI Detail Information

AFI Proper Shipping Name: TETRACHLOROETHYLENE

AFI Symbols:**AFI PSN Code:** XOW**AFI PSN Modifier:****AFI UN Id Number:** UN1897**AFI Hazard Class:** 6.1**AFI Packing Group:** III**AFI Label:****Special Provisions:** P5, N36**Back Pack Reference:** A10.5**HAZCOM Label Information****Product Identification:** TETRACHLOROETHYLENE**CAGE:** 62910**Assigned Individual:** N**Company Name:** MALLINCKRODT SPECIALTY CHEMICALS CO**Company PO Box:****Company Street Address1:** 222 RED SCHOOL LANE**Company Street Address2:** PHILLIPSBURG, NJ 08865 US**Health Emergency Telephone:** 314-982-5000**Label Required Indicator:** Y**Date Label Reviewed:** 06/12/1992**Status Code:** C**Manufacturer's Label Number:** UNKNOWN**Date of Label:** 06/12/1992**Year Procured:** N/K**Organization Code:** F**Chronic Hazard Indicator:** Y**Eye Protection Indicator:** YES**Skin Protection Indicator:** YES**Respiratory Protection Indicator:** YES**Signal Word:** WARNING**Health Hazard:** Moderate**Contact Hazard:** Slight**Fire Hazard:** Slight**Reactivity Hazard:** None

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**Material Safety
Data Sheets**Division of Facilities Services**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only****TRICHLOROETHYLENE**

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Composition/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

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**Section 1 - Product and Company Identification
TRICHLOROETHYLENE****Product Identification:** TRICHLOROETHYLENE**Date of MSDS:** 01/01/1987 **Technical Review Date:** 03/22/1993**FSC:** 6810 **NIIN:** 00-924-7107**Submitter:** D DG**Status Code:** C**MFN:** 01**Article:** N**Kit Part:** N**Manufacturer's Information****Manufacturer's Name:** PHIPPS PRODUCTS CORP (COMPANY OUT OF BUSINESS)

Manufacturer's Address1: 186 LINCOLN ST SUITE 502
Manufacturer's Address2: BOSTON, MA 02111-2403
Manufacturer's Country: US
General Information Telephone: COMPANY OUT OF BUSINESS
Emergency Telephone: COMPANY OUT OF BUSINESS
Emergency Telephone: COMPANY OUT OF BUSINESS
MSDS Preparer's Name: DEFENSE GEN SUPPLY CTR
Proprietary: N
Reviewed: Y
Published: Y
CAGE: 86511
Special Project Code: N

Item Description

Item Name: TRICHLOROETHYLENE, TECHNICAL
Item Manager: S9G
Specification Number: O-T-634
Type/Grade/Class: TYPE I
Unit of Issue: GL
Unit of Issue Quantity: 6
Type of Container: CAN, METAL

Preparer Information

Preparer's Name: PHIPPS PRODUCTS CORP
Preparer's Address1: 186 LINCOLN ST SUITE 502
Preparer's Address2: BOSTON, MA 02111-2403
Preparer's CAGE: 86511
Assigned Individual: N

Contractor Information

Contractor's Name: PHIPPS PRODUCTS CORP
Contractor's Address1: 186 LINCOLN ST SUITE 502
Contractor's Address2: BOSTON, MA 02111-2403
Contractor's Telephone: OUT OF BUSINESS
Contractor's CAGE: 86511

Section 2 - Composition/Information on Ingredients TRICHLOROETHYLENE

Ingredient Name: TRICHLOROETHYLENE (SARA III)
Ingredient CAS Number: 79-01-6 Ingredient CAS Code: M
RTECS Number: KX4550000 RTECS Code: M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:

% Low WT: % Low WT Code:

% High WT: % High WT Code:

% Low Volume: % Low Volume Code:

% High Volume: % High Volume Code:

% Text: 100.0

% Environmental Weight:

Other REC Limits: NOT ESTABLISHED

OSHA PEL: 100 PPM/100 STEL OSHA PEL Code: M

OSHA STEL: OSHA STEL Code:

ACGIH TLV: 50 PPM/100, A5 STEL, 93 ACGIH TLV Code: M

ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity: 100 LBS

DOT Reporting Quantity: 100 LBS

Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview TRICHLOROETHYLENE

Health Hazards Acute & Chronic: ACUTE: IRRITATION OF EYES, SKIN, RESPIRATORY OR G.I. TRACT. SEVERE PAIN, REDNESS OF EYES; DRYNESS OF SKIN; CNS EFFECTS LIKE, VISUAL DISTURBANCES AND MENTAL CONFUSION, HEADACHE, NAUSEA, DIZZINESS, VOMITING, DIZZINESS. CHRONIC: LIVER AND KIDNEY DAMAGE, CNS EFFECTS.

Signs & Symptoms of Overexposure:

YES/SKIN: IRRITATION, PAIN, REDNESS, DRYNESS. INHALATION: RESPIRATORY TRACT IRRITATION, HEADACHE, NAUSEA, VOMITING, DIZZINESS, VISUAL DISTURBANCES, MENTAL CONFUSION. INGESTION: SAME SYMPTOMS AS INHALATION.

Medical Conditions Aggravated by Exposure:

PRE-EXISTING EYE, SKIN, RESPIRATORY, KIDNEY OR LIVER CONDITIONS MAY BE AGGRAVATED BY EXPOSURE.

LD50 LC50 Mixture: ORAL RAT LD50: 4920 MG/KG

Route of Entry Indicators:

Inhalation: YES

Skin: YES

Ingestion: NO

Carcinogenicity Indicators

NTP: NO

IARC: YES

OSHA: NO

Carcinogenicity Explanation: SUSPECTED ANIMALS CARCINOGEN.

Section 4 - First Aid Measures TRICHLOROETHYLENE

First Aid:

INHALATION: REMOVE TO FRESH AIR. USE CPR/OXYGEN IF NECESSARY. CONSULT A PHYSICIAN.
INGESTION: IF CONSCIOUS, GIVE TWO GLASSES OF WATER. CONSULT A PHYSICIAN IMMEDIATELY.
SKIN AND EYES: FLUSH WITH PLENTY OF WATER FOR ABOUT 15-20 MINUTES, CALL A PHYSICIAN IMMEDIATELY.

Section 5 - Fire Fighting Measures TRICHLOROETHYLENE

Fire Fighting Procedures:

FULL PROTECTIVE CLOTHING AND NIOSH/MSHA APPROVED SCBA IN AN ENCLOSED AREA.

Unusual Fire or Explosion Hazard:

A STRONG IGNITION SOURCE CAN PRODUCE IGNITION.

Extinguishing Media:

WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL, FOAM.

Flash Point: Flash Point Text: NONE

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): 12.5

Upper Limit(s): 90

Section 6 - Accidental Release Measures TRICHLOROETHYLENE

Spill Release Procedures:

USE PROPER PERSONAL PROTECTION. CONTAIN FREE LIQUID IF POSSIBLE. REMOVE ALL IGNITION SOURCES. USE SUITABLE INERT ABSORBENT MATERIAL AND RECOVER FOR PROPER DISPOSAL.

Section 7 - Handling and Storage TRICHLOROETHYLENE

Handling and Storage Precautions:**Other Precautions:**

Section 8 - Exposure Controls & Personal Protection TRICHLOROETHYLENE

Respiratory Protection:

USE NIOSH/MSHA APPROVED RESPIRATOR FOR ORGANIC VAPORS/MIST IF ABOVE PEL/TLV OR SCBA IN AN ENCLOSED AREA.

Ventilation:

LOCAL EXHAUSTED/GENERAL TO MAINTAIN PEL/TLV.

Protective Gloves:

IMPERVIOUS

Eye Protection: CHEMICAL SAFETY GOGGLES.

Other Protective Equipment: IMPERVIOUS APRON. EYE-WASH FACILITIES.

Work Hygienic Practices: AVOID CONTACT WITH EYES AND SKIN; DO NOT BREATHE VAPORS/MIST; WASH THOROUGHLY AFTER EACH USE.

Supplemental Health & Safety Information: MSDS PREPARED BY DGSC-SSH/HMIS FOR COMPANY OUT-OF-

BUSINESS.

Section 9 - Physical & Chemical Properties
TRICHLOROETHYLENE

HCC: T4

NRC/State License Number: N/R

Net Property Weight for Ammo: N/R

Boiling Point: Boiling Point Text: 188.F/87C

Melting/Freezing Point: Melting/Freezing Text: -99.4F/-73C

Decomposition Point: Decomposition Text: N/K

Vapor Pressure: 57.8 Vapor Density: 4.5;AIR=1

Percent Volatile Organic Content:

Specific Gravity: 1.45

Volatile Organic Content Pounds per Gallon:

pH: N/K

Volatile Organic Content Grams per Liter:

Viscosity: N/P

Evaporation Weight and Reference: N/K

Solubility in Water: NEGLIIBLE

Appearance and Odor: CLEAR,COLORLESS LIQUID,CHLOROFORM-LIKE.

Percent Volatiles by Volume: N/K

Corrosion Rate: UNKNOWN

Section 10 - Stability & Reactivity Data
TRICHLOROETHYLENE

Stability Indicator: YES

Materials to Avoid:

ALKALI HYDROXIDES, POWDERED METALS, LIQUID OXYGEN.

Stability Condition to Avoid:

EXTREME HEAT, FLAMES, LIGHT, UV LIGHT.

Hazardous Decomposition Products:

CARBON MONOXIDE, PHOSGENE AND HYDROCHLORIC ACIDS VAPORS.

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

NOT APPLICABLE

Section 11 - Toxicological Information
TRICHLOROETHYLENE

Toxicological Information:

N/P

Section 12 - Ecological Information
TRICHLOROETHYLENE

Ecological Information:

N/P

Section 13 - Disposal Considerations
TRICHLOROETHYLENE

Waste Disposal Methods:

CONSULT LOCAL AUTHORITIES. DISPOSAL MUST BE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. WASTE MATERIAL WILL BE A LAND-BANNED HAZARDOUS WASTE.

**Section 14 - MSDS Transport Information
TRICHLOROETHYLENE****Transport Information:**

N/P

**Section 15 - Regulatory Information
TRICHLOROETHYLENE****SARA Title III Information:**

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:

N/P

**Section 16 - Other Information
TRICHLOROETHYLENE****Other Information:**

N/P

HMIS Transportation Information**Product Identification:** TRICHLOROETHYLENE**Transportation ID Number:** 92066**Responsible Party CAGE:** 86511**Date MSDS Prepared:** 01/01/1987**Date MSDS Reviewed:** 03/22/1993**MFN:** 03/22/1993**Submitter:** D DG**Status Code:** C**Container Information****Unit of Issue:** GL**Container Quantity:** 6**Type of Container:** CAN, METAL**Net Unit Weight:** 73 POUNDS**Article without MSDS:** N**Technical Entry NOS Shipping Number:** TRICHLOROETHYLENE**Radioactivity:****Form:****Net Explosive Weight:****Coast Guard Ammunition Code:****Magnetism:** N/P**AF MMAC Code:****DOD Exemption Number:**

Limited Quantity Indicator:

Multiple Kit Number: 0

Indicator: N

Kit Part Indicator: N

Review Indicator: Y

Additional Data:

Department of Transportation Information

DOT Proper Shipping Name: TRICHLOROETHYLENE

DOT PSN Code: OQK

Symbols:

DOT PSN Modifier:

Hazard Class: 6.1

UN ID Number: UN1710

DOT Packaging Group: III

Label: KEEP AWAY FROM FOOD

Special Provision(s): N36,T1

Packaging Exception: 153

Non Bulk Packaging: 203

Bulk Packaging: 241

Maximum Quantity in Passenger Area: 60 L

Maximum Quantity in Cargo Area: 220 L

Stow in Vessel Requirements: A

Requirements Water/Sp/Other: 40

IMO Detail Information

IMO Proper Shipping Name: TRICHLOROETHYLENE

IMO PSN Code: OVL

IMO PSN Modifier: P

IMDG Page Number: 6273

UN Number: 1710

UN Hazard Class: 6.1

IMO Packaging Group: III

Subsidiary Risk Label: -

EMS Number: 6.1-02

Medical First Aid Guide Number: 340

IATA Detail Information

IATA Proper Shipping Name: TRICHLOROETHYLENE

IATA PSN Code: YMD

IATA PSN Modifier:

IATA UN Id Number: 1710

IATA UN Class: 6.1

Subsidiary Risk Class:

UN Packaging Group: III

IATA Label: TOXIC

Packaging Note for Passengers: 605

Maximum Quantity for Passengers: 60L

Packaging Note for Cargo: 612

Maximum Quantity for Cargo: 220L

Exceptions:

AFI Detail Information

AFI Proper Shipping Name: TRICHLOROETHYLENE

AFI Symbols:

AFI PSN Code: YMD

AFI PSN Modifier:

AFI UN Id Number: UN1710

AFI Hazard Class: 6.1

AFI Packing Group: III

AFI Label:

Special Provisions: P5, N36

Back Pack Reference: A10.5

HAZCOM Label Information

Product Identification: TRICHLOROETHYLENE

CAGE: 86511

Assigned Individual: N

Company Name: PHIPPS PRODUCTS CORP

Company PO Box:

Company Street Address1: 186 LINCOLN ST SUITE 502

Company Street Address2: BOSTON, MA 02111-2403 US

Health Emergency Telephone: COMPANY OUT OF BUSINESS

Label Required Indicator: Y

Date Label Reviewed: 03/22/1993

Status Code: C

Manufacturer's Label Number: N/K

Date of Label: 03/22/1993

Year Procured: 1983

Organization Code: G

Chronic Hazard Indicator: Y

Eye Protection Indicator: YES

Skin Protection Indicator: YES

Respiratory Protection Indicator: YES

Signal Word: WARNING

Health Hazard: Moderate

Contact Hazard: Slight

Fire Hazard: None

Reactivity Hazard: None

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 CORNELL**Material Safety
Data Sheets**Division of Facilities Services**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only****1,1-DICHLOROETHYLENE**

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Composition/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
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**Section 1 - Product and Company Identification
1,1-DICHLOROETHYLENE****Product Identification:** 1,1-DICHLOROETHYLENE**Date of MSDS:** 10/16/1997 **Technical Review Date:** 05/06/1999**FSC:** 6830 **NIIN:** LIIN: 00N090900**Submitter:** N EN**Status Code:** A**MFN:** 01**Article:** N**Kit Part:** N**Manufacturer's Information****Manufacturer's Name:** SCOTT SPECIALTY GASES

Post Office Box: 310
Manufacturer's Address1: 6141 EASTON RD
Manufacturer's Address2: PLUMSTEADVILLE, PA 18949-0310
Manufacturer's Country: US
General Information Telephone: 215-766-8861
Emergency Telephone: 215-766-8861
Other Number for MSDS Information: 75-35-4/E-1
Emergency Telephone: 215-766-8861
Proprietary: N
Reviewed: Y
Published: Y
CAGE: 51847

Contractor Information

Contractor's Name: SCOTT SPECIALTY GASES
Post Office Box: 310
Contractor's Address1: 6141 EASTON RD
Contractor's Address2: PLUMSTEADVILLE, PA 18949-0310
Contractor's Telephone: 215-766-8861
Contract Number: N00406-98-M-Q646
Contractor's CAGE: 51847

Section 2 - Composition/Information on Ingredients 1,1-DICHLOROETHYLENE

Ingredient Name: 1,1-DICHLOROETHYLENE
Ingredient CAS Number: 75-35-4 Ingredient CAS Code: T
RTECS Number: KV9275000 RTECS Code: T
=WT: =WT Code:
=Volume: =Volume Code:
>WT: 99. >WT Code: M
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text:
% Enviromental Weight:
Other REC Limits: N/K (FP N)
OSHA PEL: 1 PPM OSHA PEL Code: M
OSHA STEL: 100 PPM OSHA STEL Code: M
ACGIH TLV: 20 MG/M3;5 PPM ACGIH TLV Code: T
ACGIH STEL: 79 MG/M3;20 PPM ACGIH STEL Code: T
EPA Reporting Quantity: 100 LBS
DOT Reporting Quantity: 100 LBS
Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview 1,1-DICHLOROETHYLENE

Health Hazards Acute & Chronic: ACUTE: INHALATION CAUSES IRRITATION OF THE RESPIRATORY TRACT. SYMPTOMS INCLUDE SHORTNESS OF BREATH, HEADACHE, CONFUSION, NAUSEA, DIZZINESS, AND UNCONSCIOUSNESS. SEVERE EXPOSURE MAY CAUSE UNCONSCIOUSNESS AND DEATH. EYE CONTACT MAY CAUSE IRRITATION, REDNESS, OR BLURRED VISION. SKIN CONTACT CAN CAUSE DEFATTING AND DERMATITIS. CAN BE ABSORBED THROUGH THE SKIN. INGESTION IRRITATES THE DIGESTIVE TRACT AND MAY CAUSE PARTIAL PARALYSIS, UNCONSCIOUSNESS AND KIDNEY DAMAGE. CHRONIC: KIDNEY AND LIVER DAMAGE. HEART DAMAGE. ALTERATION OF GENETIC MATERIAL.

Signs & Symptoms of Overexposure:
NONE.

Medical Conditions Aggravated by Exposure:
NONE KNOWN.

LD50 LC50 Mixture: N/P

Route of Entry Indicators:

Inhalation: YES

Skin: YES

Ingestion: YES

Carcinogenicity Indicators

NTP: NO

IARC: NO

OSHA: NO

Carcinogenicity Explanation: N/P

Section 4 - First Aid Measures 1,1-DICHLOROETHYLENE

First Aid:

INHALATION: IMMEDIATELY REMOVE VICTIM TO FRESH AIR. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. EYES: IMMEDIATELY FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. SKIN: IMMEDIATELY FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING. INGESTION: NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. HAVE CONSCIOUS AND ALERT PERSON DRINK 1 TO 2 GLASSES OF WATER. INDUCE VOMITING AFTER VICTIM DRINKS WATER. IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN. NOTE TO PHYSICIAN: NONE.

Section 5 - Fire Fighting Measures 1,1-DICHLOROETHYLENE

Fire Fighting Procedures:

USE NEAR NIOSH APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N). KEEP FIRE-EXPOSED CYLINDERS COOL WITH WATER SPRAY. IF POSSIBLE, STOP THE PRODUCT FLOW.

Unusual Fire or Explosion Hazard:

EMITS TOXIC FUMES UNDER FIRE CONDITIONS. CYLINDER RUPTURE MAY OCCUR UNDER FIRE CONDITIONS. HAZARDOUS COMBUSTION PRODUCTS: TOXIC CARBON MONOXIDE, HYDROGEN CHLORIDE AND PHOSGENE.

Extinguishing Media:

CARBON DIOXIDE, FOAM, OR DRY CHEMICAL.

Flash Point: =-17.7C, -3.1F **Flash Point Text:**

Autoignition Temperature: =570.C, 1058.F

Autoignition Temperature Text:

Lower Limit(s): 7.3%

Upper Limit(s): 16%

Section 6 - Accidental Release Measures**1,1-DICHLOROETHYLENE****Spill Release Procedures:**

REMOVE LEAKING CYLINDER TO EXHAUST HOOD OR SAFE OUTDOOR AREA IF THIS CAN BE DONE SAFELY. EVACUATE AND VENTILATE AREA. USE A NIOSH APPROVED SCBA IN CASE OF EMERGENCY OR NON-ROUTINE USE. SHUT OFF SOURCE IF POSSIBLE AND REMOVE SOURCE OF HEAT. ABSORB WITH SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR DISPOSAL. SPECIALIZED EQUIPMENT: NONE.

Section 7 - Handling and Storage**1,1-DICHLOROETHYLENE****Handling and Storage Precautions:****Other Precautions:**

Section 8 - Exposure Controls & Personal Protection**1,1-DICHLOROETHYLENE****Respiratory Protection:**

USE A NIOSH APPROVED SCBA IN CASE OF EMERGENCY OR NON-ROUTINE USE.

Ventilation:

PROVIDE ADEQUATE GENERAL AND LOCAL EXHAUST VENTILATION TO MAINTAIN CONCENTRATIONS BELOW EXPOSURE AND FLAMMABLE LIMITS.

Protective Gloves:

IMPERVIOUS GLOVES.

Eye Protection: ANSI APPROVED CHEMICAL WORKERS GOGGLES (FP N).

Other Protective Equipment: EMERGENCY EYEWASH AND DELUGE SHOWER MEETING ANSI DESIGN CRITERIA (FP N). COVERALLS, BOOTS, AND/OR OTHER RESISTANT PROTECTIVE CLOTHING. SAFETY SHOES WHEN HANDLING CYLINDERS.

Work Hygienic Practices: N/P

Supplemental Health & Safety Information: N/P

Section 9 - Physical & Chemical Properties**1,1-DICHLOROETHYLENE**

HCC:

NRC/State License Number:

Property Weight for Ammo:

Boiling Point: =31.8C, 89.4F Boiling Point Text:

Melting/Freezing Point: Melting/Freezing Text: N/P

Decomposition Point: Decomposition Text: N/P

Vapor Pressure: 500 MM HG @ 20C Vapor Density: 3.25 AIR=1

Percent Volatile Organic Content:

Specific Gravity: 1.218 @ 20C (H*20=1)

Volatile Organic Content Pounds per Gallon:

pH: N/P

Volatile Organic Content Grams per Liter:

Viscosity: N/P

Evaporation Weight and Reference: N/K

Solubility in Water: INSOLUBLE

Appearance and Odor: COLORLESS LIQUID WITH SWEET CHLOROFORM ODOR.

Percent Volatiles by Volume: N/P

Corrosion Rate: N/P

Section 10 - Stability & Reactivity Data 1,1-DICHLOROETHYLENE

Stability Indicator: YES

Materials to Avoid:

POWDERED ALKALI OR ALKALINE EARTH METALS, STRONG OXIDIZING AGENTS.

Stability Condition to Avoid:

STORAGE IN POORLY VENTILATED AREAS. STORAGE NEAR A HEAT SOURCE. EXPOSURE TO LIGHT, MOISTURE, AND IGNITION SOURCES.

Hazardous Decomposition Products:

HCL GAS, PHOSGENE GAS, CARBON MONOXIDE AND OXIDES OF CHLORINE.

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

N/P

Section 11 - Toxicological Information 1,1-DICHLOROETHYLENE

Toxicological Information:

LETHAL CONCENTRATION (LC50): NONE. ESTABLISHED LETHAL DOSE 50 (LD50): NOT APPLICABLE.

TERATOGENICITY: NOT APPLICABLE. REPRODUCTIVE EFFECTS: NOT APPLICABLE. MUTAGENICITY: NOT APPLICABLE.

Section 12 - Ecological Information 1,1-DICHLOROETHYLENE

Ecological Information:

NO ADVERSE ECOLOGICAL EFFECTS ARE EXPECTED.

Section 13 - Disposal Considerations 1,1-DICHLOROETHYLENE

Waste Disposal Methods:

DISPOSE OF NON-REFILLABLE CYLINDERS I/A/W FEDERAL, STATE & LOCAL REGS. ALLOW GAS TO

VENT SLOWLY TO ATM IN UNCONFINED AREA/EXHAUST HOOD. IF CYLINDERS ARE THE REFILLABLE TYPE, RETURN CYLINDER TO SUPPLIER W/ANY VALVE OUTLET PLUGS/CAPS SECURED & VALVE PROTECTIVE CAPS IN PLACE. WASTE CAN BE BURNED IN APPROVED INCINERATOR EQUIPPED W/AFTERBURNER/SCRUBBER.

Section 14 - MSDS Transport Information
1,1-DICHLOROETHYLENE

Transport Information:

CONCENTRATION: 99+%. DOT DESCRIPTION (US ONLY): PROPER SHIPPING NAME: VINYLIDENE CHLORIDE, INHIBITED; HAZARD CLASS: 3 (FLAMMABLE), PACKING GROUP I; IDENTIFICATION NUMBER: UN1303; REPORTABLE QUANTITIES: 100 LB; LABELING: FLAMMABLE LIQUID. ADR/RID (EU ONLY): CLASS 3, 1A. SPECIAL PRECAUTIONS: CYLINDERS SHOULD BE TRANSPORTED IN A SECURE UPRIGHT POSITION IN A WELL-VENTILATED TRUCK.

Section 15 - Regulatory Information
1,1-DICHLOROETHYLENE

SARA Title III Information:

THE THRESHOLD PLANNING QUANTITY FOR MATERIAL IS 10,000 LBS.

Federal Regulatory Information:

OSHA: PROCESS SAFETY MANAGEMENT: MATERIAL IS NOT LISTED IN APPENDIX A OF 29 CFR 1910.119 AS HIGHLY HAZARDOUS CHEMICAL. TSCA: MATERIAL IS LISTED IN TSCA INVENTORY. EU NUMBER: 200-864-0. NUMBER IN ANNEX 1 OF DIR 67/548: MATERIAL IS LISTED IN ANNEX 1. EU CLASSIFICATION: NOT AVAILABLE. R: 12-20-40. S: 7-16-29.

State Regulatory Information:

N/P

Section 16 - Other Information
1,1-DICHLOROETHYLENE

Other Information:

ODOR THRESHOLD: 500PPM.

HAZCOM Label Information

Product Identification: 1,1-DICHLOROETHYLENE

CAGE: 51847

Assigned Individual: N

Company Name: SCOTT SPECIALTY GASES

Company PO Box: 310

Company Street Address1: 6141 EASTON RD

Company Street Address2: PLUMSTEADVILLE, PA 18949-0310 US

Health Emergency Telephone: 215-766-8861

Label Required Indicator: Y

Date Label Reviewed: 05/06/1999

Status Code: A

Manufacturer's Label Number:

Date of Label:

Year Procured: N/K

Organization Code: F

Chronic Hazard Indicator: Y

Eye Protection Indicator: YES

Skin Protection Indicator: YES

Respiratory Protection Indicator: YES

Signal Word: WARNING

Health Hazard: Moderate

Contact Hazard: Moderate

Fire Hazard: None

Reactivity Hazard: None

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The Cornell University logo, featuring the word "CORNELL" in a serif font, with a small circular emblem to the left.**Material Safety
Data Sheets**Division of Facilities Services**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only****CARBON TETRACHLORIDE**

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Composition/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

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**Section 1 - Product and Company Identification
CARBON TETRACHLORIDE****Product Identification:** CARBON TETRACHLORIDE**Date of MSDS:** 01/01/1987 **Technical Review Date:** 02/27/2001**FSC:** 6810 **NIIN:** 00-063-6166**Submitter:** D DG**Status Code:** C**MFN:** 01**Article:** N**Kit Part:** N**Manufacturer's Information****Manufacturer's Name:** MALLINCKRODT INC., SCIENCE PRODUCTS DIVISION

Post Office Box: M
Manufacturer's Address1: PARIS BYPASS
Manufacturer's Address2: PARIS, KY 40361
Manufacturer's Country: US
General Information Telephone: 314-982-5000
Emergency Telephone: 314-982-5000
Emergency Telephone: 314-982-5000
MSDS Preparer's Name: NOT PROVIDED
Proprietary: N
Reviewed: N
Published: Y
CAGE: 62910
Special Project Code: N

Item Description

Item Name:
Item Manager:
Specification Number: O-C-265
Type/Grade/Class: NK
Unit of Issue:
Unit of Issue Quantity:
Type of Container: BOTTLE

Contractor Information

Contractor's Name: MALLINCKRODT SPECIALTY CHEMICALS CO
Contractor's Address1: 222 RED SCHOOL LANE
Contractor's Address2: PHILLIPSBURG, NJ 08865
Contractor's Telephone: 908-859-2151
Contractor's CAGE: 62910

Section 2 - Composition/Information on Ingredients CARBON TETRACHLORIDE

Ingredient Name: CARBON TETRACHLORIDE (SARA III)
Ingredient CAS Number: 56-23-5 Ingredient CAS Code: M
RTECS Number: FG4900000 RTECS Code: M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: >99
% Environmental Weight:
Other REC Limits: N/P

OSHA PEL: 10 PPM OSHA PEL Code: M

OSHA STEL: OSHA STEL Code:

ACGIH TLV: S,5PPM/10 STEL,A3 93 ACGIH TLV Code: M

ACGIH STEL: N/P ACGIH STEL Code:

EPA Reporting Quantity: 10 LBS

DOT Reporting Quantity: 10 LBS

Ozone Depleting Chemical: 1

Section 3 - Hazards Identification, Including Emergency Overview CARBON TETRACHLORIDE

Health Hazards Acute & Chronic: N/P

Signs & Symptoms of Overexposure:

INH:NARCOTIC EFFECTS.HEAD,DIZZ,NAUSEA.MAY CAUSE DEATH;ING:SEV GI
PROBLM;SKIN:DERMATITIS;EYES:IRRIT.

Medical Conditions Aggravated by Exposure:

N/P

LD50 LC50 Mixture: N/P

Route of Entry Indicators:

Inhalation: N/P

Skin: N/P

Ingestion: N/P

Carcinogenicity Indicators

NTP: N/P

IARC: N/P

OSHA: N/P

Carcinogenicity Explanation: N/P

Section 4 - First Aid Measures CARBON TETRACHLORIDE

First Aid:

INHAL: REMOVE TO FRESH AIR. GIVE CPR/OXYGEN IF NEEDED; INGEST: IF SWALLOWED, GIVE TWO
GLASSES OF WATER & INDUCE VOMIT. NOTHING BY MOUTH IF UNCON; SKIN/EYE EXPOSURE: RMV
CONTAMTD CLOTHG. WASH SKIN W/SOAP & H*2O. FLUSH SKIN/EYES W/LG H*2O; GET MED
HELP IMMEDIATELY

Section 5 - Fire Fighting Measures CARBON TETRACHLORIDE

Fire Fighting Procedures:

USE SELF-CONT'D BRTHG. APP H*2O SPRAY TO COOL CONTR.

Unusual Fire or Explosion Hazard:

NON EXPLOSIVE

Extinguishing Media:

EXTINGUISH W. AGENT SUITABLE FOR SURROUNDING FIRE.

Flash Point: Flash Point Text: NONE

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): N/R

Upper Limit(s): N/R

Section 6 - Accidental Release Measures
CARBON TETRACHLORIDE**Spill Release Procedures:**

ELIM IGN SOURCES, VENTLT & EVAC AREA. USE PROTCTV CLOTHG/RESP PROTCTION FM VAP. CONTAIN & RECOVER LIQ IF POSS. ABSORB W/VRMCULITE, EARTH, ETC. SCOOP UP W/NON-SPARKG TOOLS & PLACE IN CLOSD CONTNRS. USE H*2O SPR AY TO DISPERSE VAP/COOL CNTNR. DO NOT FLUSH TO SEWR

Section 7 - Handling and Storage
CARBON TETRACHLORIDE**Handling and Storage Precautions:****Other Precautions:**

Section 8 - Exposure Controls & Personal Protection
CARBON TETRACHLORIDE**Respiratory Protection:**

SUPPLIED AIR RESPIR/SCBA; ESCAPE: GAS MASK

Ventilation:

LOCAL EXHAUST TO MAINTN BELOW TLV.

Protective Gloves:

IMPERVIOUS

Eye Protection: GOGGLES/FACE SHIELD**Other Protective Equipment:** FULL PROTECTIVE CLOTHING, SAFETY SHOWER, EYE WASH STATION**Work Hygenic Practices:** N/P

Supplemental Health & Safety Information: MSDS FROM MFR DATED: JAN 85, CONFORMS TO OSHA HAZ COMM STD; POSSIBLE CANCER HAZARD BASED ON TESTS W/LAB ANIMALS. AS DEFINED BY IARC, MA NIOSH, NTP, TLV.

Section 9 - Physical & Chemical Properties
CARBON TETRACHLORIDE**HCC:** T3**NRC/State License Number:** NOT RELEVANT**Net Property Weight for Ammo:** N/R**Boiling Point:** =76.7C, 170.F **Boiling Point Text:****Melting/Freezing Point:** Melting/Freezing Text: N/A**Decomposition Point:** Decomposition Text: N/A**Vapor Pressure:** 91 **Vapor Density:** 5.3

Percent Volatile Organic Content:

Specific Gravity: 1.59

Volatile Organic Content Pounds per Gallon:

pH: N/P

Volatile Organic Content Grams per Liter:

Viscosity: N/P

Evaporation Weight and Reference: N/K

Solubility in Water: NEGLIGIBLE

Appearance and Odor: COLORLESS LIQUID. ETHER-LIKE ODOR.

Percent Volatiles by Volume: N/K

Corrosion Rate: N/P

Section 10 - Stability & Reactivity Data CARBON TETRACHLORIDE

Stability Indicator: YES

Materials to Avoid:

CHEMICALLY ACTIVE METALS E.G. NA, K & MG; SOME PLASTICS.

Stability Condition to Avoid:

NOT KNOWN

Hazardous Decomposition Products:

CO, CO*2, HCL GAS, CL*2 & PHOSGENE UPON THERMAL DECOMPOSITION.

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

N/K

Section 11 - Toxicological Information CARBON TETRACHLORIDE

Toxicological Information:

N/P

Section 12 - Ecological Information CARBON TETRACHLORIDE

Ecological Information:

N/P

Section 13 - Disposal Considerations CARBON TETRACHLORIDE

Waste Disposal Methods:

SPILLS & LOT SIZES CAN BE COLLECTED FOR RECLAMATION OR ABSORBED IN SUITABLE ABSORBENT FOR DISPOSAL AS A HAZARDOUS SUBSTANCE IN A RCRA APPROVED LAND FILL. ENSURE COMPLIANCE W/LOCAL, STATE & FEDERAL REGULATIONS; CWA RQ: 5000LBS.

Section 14 - MSDS Transport Information CARBON TETRACHLORIDE

Transport Information:

N/P

Section 15 - Regulatory Information
CARBON TETRACHLORIDE**SARA Title III Information:**

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:

N/P

Section 16 - Other Information
CARBON TETRACHLORIDE**Other Information:**

N/P

HMIS Transportation Information**Product Identification:** CARBON TETRACHLORIDE**Transportation ID Number:** 45509**Responsible Party CAGE:** 62910**Date MSDS Prepared:** 01/01/1987**Date MSDS Reviewed:** 02/27/2001**MFN:** 02/27/2001**Submitter:** D DG**Status Code:** C**Container Information****Unit of Issue:****Container Quantity:****Type of Container:** BOTTLE**Net Unit Weight:** 8 LBS**Article without MSDS:** N**Technical Entry NOS Shipping Number:****Radioactivity:****Form:****Net Explosive Weight:** N/R**Coast Guard Ammunition Code:** N/R**Magnetism:** N/R**AF MMAC Code:****DOD Exemption Number:** N/R**Limited Quantity Indicator:****Multiple Kit Number:** 0**Kit Indicator:** N**Kit Part Indicator:** N**Review Indicator:** Y**Additional Data:****DOT RQ:** 10 LBS.**Department of Transportation Information****DOT Proper Shipping Name:** CARBON TETRACHLORIDE**DOT PSN Code:** CVY

Symbols:**DOT PSN Modifier:****Hazard Class:** 6.1**UN ID Number:** UN1846**DOT Packaging Group:** II**Label:** POISON**Special Provision(s):** N36,T8**Packaging Exception:** NONE**Non Bulk Packaging:** 202**Bulk Packaging:** 243**Maximum Quantity in Passenger Area:** 5 L**Maximum Quantity in Cargo Area:** 60 L**Stow in Vessel Requirements:** A**Requirements Water/Sp/Other:** 40**IMO Detail Information****IMO Proper Shipping Name:** CARBON TETRACHLORIDE**IMO PSN Code:** DPR**IMO PSN Modifier:** P**IMDG Page Number:** 6096**UN Number:** 1846**UN Hazard Class:** 6.1**IMO Packaging Group:** II**Subsidiary Risk Label:** -**EMS Number:** 6.1-02**Medical First Aid Guide Number:** 340**IATA Detail Information****IATA Proper Shipping Name:** CARBON TETRACHLORIDE**IATA PSN Code:** FKO**IATA PSN Modifier:****IATA UN Id Number:** 1846**IATA UN Class:** 6.1**Subsidiary Risk Class:****UN Packaging Group:** II**IATA Label:** TOXIC**Packaging Note for Passengers:** 610**Maximum Quantity for Passengers:** 5L**Packaging Note for Cargo:** 612**Maximum Quantity for Cargo:** 60L**Exceptions:****AFI Detail Information****AFI Proper Shipping Name:** CARBON TETRACHLORIDE**AFI Symbols:****AFI PSN Code:** FKO**AFI PSN Modifier:****AFI UN Id Number:** UN1846**AFI Hazard Class:** 6.1**AFI Packing Group:** II**AFI Label:****Special Provisions:** P5, N36**Back Pack Reference:** A10.5**HAZCOM Label Information**

Product Identification: CARBON TETRACHLORIDE

CAGE: 62910

Assigned Individual: N

Company Name: MALLINCKRODT SPECIALTY CHEMICALS CO

Company PO Box:

Company Street Address1: 222 RED SCHOOL LANE

Company Street Address2: PHILLIPSBURG, NJ 08865 US

Health Emergency Telephone: 314-982-5000

Label Required Indicator: Y

Date Label Reviewed: 12/16/1998

Status Code: C

Manufacturer's Label Number:

Date of Label: 12/16/1998

Year Procured: N/K

Organization Code: F

Chronic Hazard Indicator: N/P

Eye Protection Indicator: N/P

Skin Protection Indicator: N/P

Respiratory Protection Indicator: N/P

Signal Word: N/P

Health Hazard:

Contact Hazard:

Fire Hazard:

Reactivity Hazard:

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Appendix
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APPENDIX F
CDM HAZARD GUIDELINES

Section 15

Hearing Conservation

15.1 Purpose and Scope

The purpose of this section is to prevent permanent and temporary occupational hearing loss that results from overexposure to noise. This section is applicable to all Camp Dresser & McKee Inc. (CDM) employees and to all equipment and property used by CDM.

15.2 Definitions

Action Level - An exposure to an 8-hour time-weighted average of 85 decibels measured with a dosimeter or sound-level meter on the A-scale at slow response; or equivalently, a dose of 50 percent measured as per paragraph 15.5.5 of this section. The action level is the criterion for instituting noise surveys and employee participation in the audiometric testing program.

Administrative Control - Any procedure that limits noise exposure by control of work schedules.

Audiogram - A chart, graphs, or tables that result from an audiometric test. An audiogram shows an individual's hearing threshold level as a function of frequency (Hz).

Audiologist - A professional who specializes in the study and rehabilitation of hearing and who is certified by the American Speech, Hearing and Language Association, or licensed by a state board of examiners.

Audiometer - An electronic instrument that measures hearing threshold levels and conforms to the requirements and specifications of the current ANSI Standard S3.6.

Baseline Audiogram - An audiogram against which future audiograms are compared. It may also be described as a reference, pre-placement, pre-assignment, or entrance audiogram.

Biological "Functional" Calibration Check - An audiometric test that uses one or more individuals with known, stable hearing levels to check proper functioning and stability of an audiometer and to identify any unwanted or distracting sounds.

Cut-off Level - All sound levels at or above the cut-off level are averaged into the calculations that relate to noise exposure. All sound levels below the cut-off level are not included.

Deafness: The condition in which the average hearing threshold level for pure tones at 500, 1000, 2000, and 3000 Hz (frequencies used for speech), is at least 93 decibels (reference ANSI S3.6-1969). This is generally accepted as representing a 100 percent hearing handicap for normal speech.

Decibel (dB) - A unit of measurement of sound-pressure level. The decibel level of a sound is related to the logarithm of the ratio of sound pressure to a reference pressure. The dB has meaning only when the reference is known. The internationally accepted reference pressure used in acoustics is 20 micropascals.

Decibels, A-Weighted (dBA) - A sound level reading in decibels made on the A-weighting network of a sound-level meter at slow response.

Decibels, Peak (dBp) - A unit used to express peak sound-pressure level of impulse noise.

Dose Criterion Sound Level - The average sound level at a given dose criterion length for which the dose represents 100 percent of the allowable exposure. The Federal Occupational Safety and Health Administration (Fed-OSHA) requires a dose criterion sound level of 90 dBA for an exposure duration of eight hours. ARC has a dose criterion level of 85 dBA for an 8-hour exposure, per section 29.6.

Dose Criterion Length - The permissible exposure duration (in hours) for a given dose criterion sound level for which the dose represents 100 percent of the allowable exposure.

Eight-Hour Dose - The actual dose (as a percentage) accumulated over the duration of the work shift and based on a regulations defined criterion level and criterion length.

Engineering Control - Any mechanical device, physical barrier, enclosure, or other design procedure that reduces the sound level at the source of noise generation or along the path of propagation of the noise to the individual. This does not include protection equipment such as earmuffs, plugs, or administrative controls.

Hazardous Noise - Noise generated by an operation, process, or procedure that is of sufficient duration and intensity to be capable of producing a permanent loss of hearing in an unprotected person. Generally, this is interpreted as persistent noise levels equal to or greater than 85 dBA or combinations of higher intensities for durations shorter than 8 hours.

Hertz (Hz) - A unit of measurement of frequency that is numerically equal to cycles per second.

Impulsive or Impact Noise - Variations in noise levels that involve peaks of intensity that occur at intervals of greater than one second. If the noise peaks occur at intervals of one second or less, the noise is considered continuous.

Lav - The average sound level (in dBA) computed for a chosen averaging time duration.

Lav (80) - The average sound level (in dBA) computed for a chosen averaging time duration, using an 80-dBA cut-off level. The 80-dBA cut-off level is used by Fed-OSHA for hearing conservation compliance requirements.

Manager - A broad term that can refer to managers, program and project managers, direct managers, site managers, supervisors, department heads, group heads, branch chiefs, owners, and/or persons that operate in a management capacity or supervisory roll with respect to affected employees.

Medical Pathology - A disorder or disease. For the purposes of this chapter, a condition or disease that affects the ear and should be treated by a physician specialist.

Monitoring Audiogram - An audiometric test obtained at least annually to detect shifts in an individual's threshold of hearing by comparison to the baseline audiogram.

Noise - Unwanted sound.

Noise Dose - A measure of cumulative noise exposure over a stated period, which takes into account both the intensity of the sound and the duration of the exposure.

Noise Dosimeter - An electronic instrument that integrates cumulative noise exposure over time and directly indicates a noise dose.

Noise-Hazard Area - Any work area with a noise level of 85 dBA or greater.

Otolaryngologist - A physician who specializes in the diagnosis and treatment of disorders of the ear, nose, and throat.

Representative Exposure - The measurements of an employee's noise dose, or an 8-hour time-weighted average sound level that a qualified person deems representative of the exposure of other employees in that work area or job classification.

Standard Threshold Shift (STS) - An average hearing threshold shift of 10 dB or more at 2000, 3000, and 4000 Hz in either ear. A threshold shift can be temporary or permanent. Temporary threshold shift is a change in hearing threshold, primarily due to exposure to high-intensity noise, that is usually recovered in 14 to 72 hours. Any loss that remains after an adequate recovery period is termed permanent threshold shift.

Sound-pressure level - The term used to identify a sound measurement (expressed in decibels) obtained with a sound-level meter that has a flat frequency response. This is mathematically equivalent to 20 times the common logarithm of the ratio of the measured A-weighted sound pressure to the standard reference pressure of 20 micropascals (measured in decibels). For use with this standard, slow time response is required in accordance with the current ANSI S1.4.

Sound-level meter (SLM) - An electronic instrument for the measurement of sound levels that conforms to the requirements for a Type II sound-level meter as specified in ANSI S1.4-1971.

Time-Weighted Average (TWA) Sound Level - the sound level that, if constant over an 8-hour workday exposure, would result in the same noise dose as is measured.

TWA (80) - The time-weighted average level that corresponds to a noise dose computed with an 80-dBA cut-off level.

15.3 Responsibilities

Health and Safety Manager (HSM)

- Develops and implements a hearing conservation program.
- Provides guidance to employees whose jobs expose them to hazardous noise levels and their managers.
- Provides periodic noise monitoring when necessary.
- Periodically reviews the hearing conservation program for compliance standards.
- Provides employees access to noise survey/dosimetry records.
- Coordinates the medical surveillance program that includes baseline and annual audiograms.
- Recommends the selection of hearing protection and specify performance (attenuation) requirements.
- Notifies management of all areas that have been designated as noise hazard areas.

Health and Safety Coordinators (HSC)

- Reports suspected hazardous noise areas to the HSM so that noise monitoring can be conducted.
- Ensures that employees who work in designated noise hazard areas (or are otherwise exposed to hazardous noise) receive pre-placement, annual, and termination audiograms.
- Ensures that employees in high-noise areas use hearing protection devices.
- Notifies the HSM of any changes in operations that require noise determinations or evaluations.
- Ensures that hearing protection devices that have been approved by the HSM are available for use by employees.

- Ensures that employees who participate in the Hearing Conservation Program attend required training and provides documentation of such training to the HSM.
- Ensures that caution signs are posted in designated noise hazard areas.
- Ensures the design and application of engineering controls recommended by the HSM that are needed to reduce noise exposures to acceptable limits or to the maximum extent feasible.

Employees

Employees who work in high noise areas are responsible to:

- Wear and maintain hearing protection as required by the HSC.
- Cooperate with H&S personnel in activities undertaken to evaluate hazardous noise.
- Notify direct or project manager or HSC of areas, operations, or equipment that may produce hazardous noise.
- Attend hearing conservation training when necessary.
- Participate in the medical surveillance program.

15.4 Noise Exposure Limits

Protection against the effects of noise exposure shall be provided when sound levels exceed those in the Tables 15-1 and 15-2 below. Noise exposure limits are generally applied as an 8-hour exposure limit of 85 dBA. For exposures of shorter or longer durations, the exposure limit may be adjusted as indicated in the table. Hearing conservation program elements are expected to be implemented whenever employee noise exposures equal or exceed an 8-hour time-weighted average of 80 dBA measured as per paragraph 15.5.5 of this Section. Hearing conservation program elements include exposure monitoring, audiometric testing, medical monitoring, and training. The dose criterion of 80 dBA for an 8-hour exposure is referred to as the action level.

Table 15-1 Continuous Noise Permissible Exposure Limits

Duration (Hours)	Sound Level (dBA)*
16	80
8	85
4	90
2	95
1	100
0.5	105
0.25	110
0.125 or less	115

*Measured on the A-scale of a standard sound-level meter set at slow response.

Table 15-2 Impulse Noise Permissible Exposure Limits

Sound Level (dBP)*	Permitted Impulses/Day
140	100
130	1,000
120	10,000

*Peak sound-pressure level.

15.5 Hearing Protection Methods

15.5.1 Engineering Controls

Where feasible, facilities and equipment will be procured, designed, operated, and/or modified in such a manner as to prevent employee exposure to continuous noise levels above 85 dBA over an 8-hour TWA or impulsive noise above 125 dBP. Any reduction in employee noise exposure, even if not reduced below 85 dBA, is beneficial. If engineering controls fail to reduce sound levels to within the limits of section 4.0 hearing-protective equipment and/or administrative methods of noise-exposure protection must be used.

15.5.2 Personal Hearing Protection

- Personal protective equipment is to be used only temporarily or if engineering controls are not feasible or practical.
- The HSCs shall enforce the use of earmuffs and/or plugs by employees assigned to work in areas where they will be exposed to continuous noise (without regard to duration of exposure) in excess of 85 dBA or to impulse noise in excess of 140 dB. Disposable earplugs and/or earmuffs will be made available for employee use (if desired) if noise exposures under 85 dBA create a nuisance. Earplugs will be provided for the exclusive use of each employee and will not be traded or shared.
- Hearing protectors must attenuate employee noise exposure to a level of 85 dBA or below. Both earmuffs and plugs are required where noise levels equal or exceed 110dBA. For employees with STS, protectors must attenuate exposure to an 8-hour TWA of 80 dBA. Estimation of the adequacy of hearing-protector attenuation should be performed according to the methods OSHA specifies in 29 CFR 1910.95 App B, Methods for estimating the adequacy of hearing protector attenuation.
- If reusable pre-formed earplugs are used, they will be permanently issued to the employee and fitted to the employee under medical supervision. During fitting, the employee will be instructed in the proper method of insertion, storage, and cleaning of the earplugs. Earplugs will be checked during annual medical examinations.
- Earmuffs will be provided for employees when analysis of noise environments shows that the attenuation provided by earplugs is not sufficient to reduce noise exposures below 85dBA. The user shall inspect earmuffs on a regular basis.
- Special hearing-protective equipment, such as sound-suppression communication headsets, may be used in noise hazard areas. These devices should be inspected regularly. Sound-suppression headsets may not be used if they have been damaged, altered, or modified in any way that affects the attenuation characteristics. If replacement parts (such as ear cup seals) are available, the headsets may be repaired and reused. If sound-suppression headsets are not permanently issued to employees, such equipment must be cleaned and sanitized before re-issuance.

15.5.3 Administrative Controls

If hearing-protective equipment or engineering controls are not sufficient to attenuate noise to less than 85 dBA, the duration of time spent in the noise hazard area shall be limited, so as not to exceed the exposure limits specified in this section 4.0.

15.5.4 Noise Monitoring

- Measurement of potentially hazardous sound levels shall be conducted when any information, observation, or calculation suggests that an employee could be exposed to a noise level in excess of an 8-hour TWA. This includes, but is not

limited to, times when representative exposures need to be documented, when employees complain of excessive noise, or when it is difficult to understand a normal conversation if the speaker and the listener face each other at a distance of two feet. Any new equipment, operation, job, or procedure with the potential for creating hazardous noise should be evaluated with regard to noise emissions before startup. All continuous, intermittent, and impulsive sound levels from 80 to 130 dBA will be integrated into the noise measurements.

- Both noise dosimetry and area monitoring will be repeated periodically, or whenever any changes to facilities, equipment, work practices, procedures, or noise-control measures alter potential noise exposures.
- Employees and/or their representatives will be provided an opportunity to observe noise dosimetry and area monitoring activities.
- Areas determined to have noise levels at or above 85dBA must be posted as noise hazard areas.
- Affected employees (employees whose exposures have been determined to exceed the Action Level) shall be notified of the results of noise monitoring.

15.5.5 Noise-Measurement Methods

- Sound-level meters must meet Type II requirements of ANSI S1.4 and must be capable of measuring sound in the range of 80 to 130 dBA.
- Noise dosimeters must meet Class 2A-90/80-5 requirements of ANSI S1.25 and be capable of integrating sound levels of 80 dB and above.
- Employee noise doses may be ascertained by using either a noise dosimeter or sound-level meter. If a sound-level meter is used to estimate an employee's dose, the noise survey will include a time and motion study to document the variations in the employee's noise exposure during the working shift. If an employee moves about or noise intensity fluctuates over time, noise exposure is more accurately estimated by personal dosimetry. Regardless of the method chosen, a sufficient number of readings/measurements will be made to accurately reflect noise exposure.
- Employee exposure measurements will be made in such a manner as to accurately represent the actual exposure to noise.
 - When using a noise dosimeter to determine an employee's noise exposure, the microphone will be attached to the employee in the area of the employee's shoulder.
 - When using a sound-level meter, the microphone should be positioned not less than two inches, nor more than two feet, from the employee's ear.

- Measurements will be made with the employee at his/her regular work stations(s).
- Before and after each use, dosimeters and sound-level meters will be calibrated using acoustical calibrators to verify the accuracy of the measuring equipment.
- If any sound-level meter or noise dosimeter is dropped, or if the microphone receives a sharp impact, a calibration check shall be performed to ensure that it is still working properly, before taking additional measurements.
- Sound-level meters and noise dosimeters that are not working properly, or are out of calibration, shall not be used to determine an employee's noise exposure.

15.6 Medical Surveillance Program

Program Participation

- Whenever an employee is routinely occupationally exposed to continuous noise at or above the Action Level or to impact or impulsive noise in excess of the limits specified in Section 4.0, the employee shall be enrolled in a medical surveillance program. Employee noise exposure shall be determined without regard to any sound attenuation provided by the use of hearing protectors.
- Each employee placed in a job that required participation in a medical surveillance program shall undergo a physical examination before being assigned to duties that involve exposure to high-intensity noise. The examination shall include a baseline audiogram, a medical examination to determine any pre-existing medical pathology of the ear, and a work history to document past noise exposures. The history shall include a detailed review of past work histories and possible occupational and non-occupational noise exposures.
- When it is discovered that employees have been working where they encounter hazardous noise or incur exposures that exceed the action level and have not had a physical examination, one shall be conducted within 30 days. The audiogram must follow at least 14 hours of no known exposure to sound levels in excess of 80 dBA. This interval should be sufficient to allow recovery from noise-induced temporary threshold shift.
- Personnel who suffer from acute diseases of the ear shall not be placed in hazardous noise areas until the condition has abated, particularly if such diseases preclude the wearing of hearing protectors, cause hearing impairment, or produce tinnitus.
- All employees who are participants in the medical surveillance program must receive an annual audiogram.

- All CDM employees who have participated in the medical surveillance program shall receive a final audiometric examination before termination of employment with CDM, job changes within the installation that would alter noise exposure, transfer to another installation, or retirement.

15.7 Audiometric Testing

15.7.1 Medical Personnel

Medical personnel who perform audiometric tests must be qualified, trained, and knowledgeable in operating equipment used and be under the supervision of an audiologist or physician. If manual audiometers are used, the Council for Accreditation in Occupational Hearing Conservation must certify qualifications of personnel who operate the audiometer. Hearing threshold levels will be determined by audiometers calibrated to zero reference levels of the ANSI S3.6 standard for audiometers.

15.7.2 Pure Tone, Air Conduction Testing

Pure tone, air conduction testing shall be conducted at test frequencies of 500, 1000, 2000, 3000, 4000, and 6000 Hz for each ear. Audiometric test equipment shall meet the specification, maintenance, and use requirements of ANSI S3.6. Where a pulsed-tone, self-recording audiometer is used, it will also meet the requirements of 29 CFR 1910.95, Table 3.

- A listening check shall be performed daily before use to ensure that the audiometer is free from distorted or unwanted sounds.
- A functional check shall be performed each day either by using an "acoustical ear" calibrator (dBA sound-level meter with 9A Type Earphone Coupler) or by testing an individual with a known and stable hearing baseline (a "biological check"). A record will be kept of the daily checks. Deviations of 5 dB or more require an acoustical calibration test.
- An acoustical calibration test (using a sound-level meter, octave-band filter set, and a National Bureau of Standards 9A Coupler) shall be performed at least annually (semi-annually for self-recording audiometers), or when a functional check indicates a deviation of 5 dB or more. The acoustical calibration tests shall conform to the requirements of 29 CFR 1910.95, Appendix E. Deviations of 10 dB or more will require an exhaustive calibration.
- An exhaustive calibration shall be performed at least every two years, or whenever an acoustical calibration test indicates an error of 10 dB or more. The test will meet the criteria of the current ANSI S3.6 guidelines appropriate for the instrument. Following calibration, the front panel of the audiometer shall be labeled with a tag indicating that it has been calibrated to ANSI S3.6 guidelines and the date of the calibration.

- Rooms used for audiometric testing shall not have background sound-pressure levels that exceed those in the table below. Sound-pressure levels for rooms used for audiometric testing must be checked at least every two years.

**Table 15-3 Maximum Background Sound-Pressure Levels
for Audiometric Test Booths**

Frequency (Hz)	Sound-Pressure Level (dBA)
500	27
1,000	30
2,000	35
4,000	42
8,000	45

- Employees must receive advance written notification of the need to avoid high levels of occupational and nonoccupational noise during the 14 hours immediately preceding an audiometric test. Properly fitted hearing protectors and/or other hearing-protective devices may be used to prevent excessive noise exposures during this period.
- A physician or other qualified person shall compare annual audiograms with the employee's baseline audiogram, to determine if it is valid and if a standard threshold shift has occurred. It is desirable to review the employee's audiogram record for patterns of change over time. When determining if a standard threshold shift has occurred, allowances for the effects of aging to the hearing threshold level may be made using the procedure described in 29 CFR 1910.95, Appendix F. Audiograms referenced to ASA-1951 must be converted to ANSI S3.6-1969 before hearing threshold levels can be properly determined (see the table below for conversion).

Table 15-4 Threshold Audiogram Conversion ASA-1951 to ANSI-1969

Frequency	dB Difference
250	15
500	15
1000	10
2000	10
3000	10
4000	5
6000	10
8000	10

- To convert an ASA-1951 reference threshold audiogram to ANSI-1969, add the difference in values.
- To convert ANSI-1969 to ASA-1951, subtract the values.
- When evaluation of an audiogram indicates that a standard threshold shift has occurred, a retest shall be scheduled within 30 days to determine if the shift is temporary or permanent. A medical evaluation may be warranted at this time to determine if an acute medical condition is a contributing factor.
- An annual audiogram may be substituted for the baseline when, in the judgment of the audiologist, otolaryngologist, or physician who is evaluating the audiogram, the hearing threshold shown on the annual audiogram indicates significant improvement over the baseline audiogram.
- The employee will be notified of audiometric testing results in writing within 21 days of determination of a permanent threshold shift. The subcontract health care provider retained by CDM shall notify the employer and employee in writing of determinations of permanent threshold shifts.

15.7.3 Criteria for Referral to an Audiologist

- The following are criteria for referral to an audiologist for more comprehensive testing.
- Average hearing threshold level greater than 25 dB at 500, 1000, and 2000 Hz.

- Single frequency loss greater than 55 dB at 3000 Hz, or greater than 30 dB at 500, 1000, or 2000 Hz.
- Difference in average hearing threshold level between the better and poorer ear of more than 15 dB at 500, 1000, and 2000 Hz; or more than 30 dB at 3000, 4000, and 6000 Hz.
- Reduction in hearing threshold level in either ear from the baseline or previous monitoring audiogram of more than 15 dB at 500, 1000, or 2000 Hz; or more than 30 dB at 3000, 4000, or 6000 Hz.
- Variable or inconsistent responses or unusual hearing-loss curves.

15.7.4 Conditions that Require Follow-Up Review of Employees with Hearing Illness and Responses

- When a permanent threshold shift is detected, a follow-up review must be conducted.
- An employee who is not currently using hearing protection shall be provided (and fitted as necessary) with hearing protectors and shall be trained in their use.
- The employee shall be provided/refitted with hearing protectors that offer greater sound attenuation, as warranted, if hearing protectors are already in use.
- The employee shall be trained/retrained on the hazardous effects of noise and the need to use hearing protection.
- The employee's work area shall be investigated to determine if work practices or changes in equipment or procedures can be made that will decrease noise hazards or if changes have resulted in an increase in noise hazards.
- The employee shall be reassigned to work in a low-noise area, as necessary, to prevent further hearing impairment. The employee will continue to participate in the Hearing conservation program.

15.8 Noise Hazard Warning Signs

Caution signs that clearly indicate a hazard of high noise levels and the requirements to wear hearing protection shall be posted at the entrance(s) to, and the periphery of, noise hazard areas. Decals or placards with similar statements shall be affixed to power tools and machines that produce hazardous noise levels. Signs and decals shall have wording in black letters on a yellow background (Refer to section 15.11 for noise hazard warning sign specifications.)

15.9 Employee Training

- Each employee who participates in the Hearing conservation program shall receive annual training. The training must include, but not be limited to:

- An overview of the CDM Hearing conservation program
 - A review of the effects of noise on hearing (including permanent hearing loss)
 - Noise control principles
 - The purpose, advantages, disadvantages, and attenuation characteristics of various types of ear protectors
 - Instruction on selection, fitting, use, and care of hearing protectors
 - An explanation of the audiometric testing and its purposes
- Personnel will be encouraged to use hearing protectors when exposed to hazardous noise in non-occupational settings (e.g., from lawn mowers, firearms, etc.).

15.10 Records Maintenance

- Audiogram and noise-exposure records shall be maintained as a permanent part of employee medical records. If noise-exposure measurement records are representative of the exposures of other employees participating in the hearing conservation program, the range of noise levels, and the average noise dose will be made a permanent part of the medical records of the other employee as well.
- In addition to audiometric test data, each medical record will, as a minimum, identify:
 - The audiometric reference level to which the audiometer was calibrated at the time of testing
 - The date of the last calibration of the audiometer
 - The name, the social security number, and job classification of the employee tested
 - The employee's most recent noise exposure assessment
 - The date(s) hearing conservation training was received.
- Records of the background sound-pressure levels in the audiometric test rooms, and data and information concerning calibration and repair of sound-measuring equipment and audiometers (as well as all audiometric test data) will be maintained by CDM's medical consultant in accordance to OSHA and other applicable regulations.
- Accurate records of noise surveys/monitoring, results of the special noise studies, and records of special actions or engineering controls installed to control noise

exposures will be maintained for the duration of the affected employee's employment, plus 30 years.

15.11 Signs and Decals

15.11.1 Noise Hazard Warning Sign Specifications

Warning signs must read:

CAUTION
NOISE AREA
MAY CAUSE HEARING LOSS
USE PROPER
HEARING PROTECTION
IN THIS AREA

The lettering is almost always all caps, black, and on a yellow background.

15.11.2 Noise Hazard Warning Sign Specifications

Decals must have a yellow background and black lettering (all caps). The decal must be self-adhesive on the side opposite the written warning. The written warning must read:

CAUTION
NOISY EQUIPMENT MAY CAUSE HEARING LOSS
USE PROPER
HEARING PROTECTION

The word caution is in yellow lettering with a black background superimposed on the yellow background of the label. As shown, the word caution is two point sizes larger than the lettering in the rest of the warning.

16.2 Housekeeping

These guidelines are for the establishment and administration of a clean and orderly work environment at field project sites. A continuous housekeeping program strongly tends to prevent accidents. A clean and orderly work environment can be achieved and maintained through ongoing housekeeping efforts undertaken by personnel at all levels. Project managers shall initiate participation in housekeeping activities and good work habits, not only at the end of a work assignment, but throughout the evolution of the project.

- To achieve these benefits, the team shall plan the location of equipment and storage facilities to allow the easy flow of personnel, equipment, materials, fire hazards, and to prevent the obstruction of evacuation, fire fighting, or rescue activities.
- Store materials in a manner that facilitates access of material handling equipment and personnel handling limitations. Lack of sufficient workspace and storage capacity leads to the potential for accidents and decreases efficiency.
- Avoid storage of flammable liquids, such as paints and thinners unless they are required for specific project needs. If needed, such storage shall be within a metal storage cabinet that has been labeled and approved for the storage of flammable liquids.
- Continuously maintain work areas in a neat and orderly manner.
- Containers should be provided for the collection of waste, trash, and other non-hazardous refuse. Investigation-derived waste and other waste materials that are potentially hazardous should be stored and labeled in accordance with project specific procedures that meet regulatory and client requirements.
- Deploy leads, hoses, and extension cords so they do not present tripping hazards, and are not subject to contact with moisture or physical stress. Where possible they should be hung overhead with non-conductive material and kept away from walkways, doors, stairs, and ladders.
- Protect protruding rebar and anchor bolts and conspicuously mark them.
- Clean small spills that create slip hazards and or flammability hazards immediately and not leave them unattended.
- Keep walkways, aisles, stairways, and passageways in a clear and unobstructed condition.
- Prohibit eating and drinking in work areas where there is potential exposure to toxic or hazardous materials. Smoking is limited to designated smoking areas where there is no such exposure.

16.7 Fall Protection

Camp Dresser & McKee Inc. (CDM) employees who visit active construction sites may be exposed to falls. A fall exposure is considered to exist when an employee is within 6 lateral feet of a change in elevation of 6 vertical feet or more. Typical exposures can include:

- Excavations
- Roofs
- Leading edge of a surface (floor)
- Floor openings

All employees should use fall protection 100 percent of the time when exposed to a fall in excess of six feet or when required by rules such as those of a client or the owner or operator of a facility. Fall protection may consist of any of the following:

- Guardrails
- Safety Nets
- Positioning Systems
- Warning Systems
- Personal Fall Arrest Systems

Employees should not use fall arrest equipment until they have been properly trained. Fall protection training can be arranged by contacting your division HSM. Project managers and site managers shall ensure fall protection is available and used as required for all employees for whom they are responsible and that employees receive adequate training in the use of the equipment.

The following work practices and guidelines should be considered for protection against falls:

- Before working or walking on a surface, consider the strength and structural integrity of the surface. Can it support employees and any needed equipment or material safely? Employees shall work on those surfaces only when the surfaces have the requisite strength and structural integrity.
- When not protected by any other means of fall protection, such as safety nets or scaffold with proper guardrails, employees shall use full body harnesses, lanyards with double-locking snap hooks, and an adequate anchorage (fall arrest equipment). To achieve 100 percent fall protection, employees may need to use a two-lanyard system and/or vertical or horizontal lifelines, retractable lifelines, or other approved positioning devices.

- Employees shall rig fall arrest equipment so that it minimizes the potential for a fall arrest event or any potential free fall, lateral swing, or contact with any lower object. Under no circumstances shall fall arrest equipment be rigged so that an employee can free fall more than 6 feet.
- Anchorage points for fall arrest equipment shall be capable of supporting 5,000 lbs per employee attached. Anchorage points for fall arrest equipment shall be located above the employee's body harness attachment point where practical.
- When vertical lifelines are used, a separate lifeline shall protect each employee. The lifeline shall be properly weighted at the bottom and terminated to preclude a device such as a rope grab from falling off the line.
- Horizontal lifelines should be limited to two persons at one time between supports and maintain a safety factor (strength / requirement) of at least two.
- Before each use, employees shall visually inspect all fall arrest equipment for cuts, cracks, tears or abrasions, undue stretching, overall deterioration, mildew, operational defects, heat damage, or acid or other corrosion. Equipment showing any defect shall be withdrawn from service. All fall arrest equipment subjected to impacts caused by a free fall or by testing shall be removed from service. CDM personnel shall use full body harnesses for personal fall protection. Fall protection equipment is available from the field equipment centers.
- Fall arrest equipment should be stored in a cool dry place not subjected to direct sunlight.
- Fall arrest equipment shall not be used for any other purpose, such as towropes or hoist lines.
- Proper guardrails shall be installed on open sides of all walkways and runways where the fall distance exceeds 4 feet. Proper guardrails shall be installed on open sided floors where the fall distance exceeds 6 feet. All floor openings or floor holes shall be protected by guardrails or hole covers. If hole covers are used, they shall be strong enough to support the maximum intended load, secured against displacement, and properly labeled.
- When guardrails are used for fall protection, they shall consist of a top rail, intermediate rail, and toe board. The top rail shall have a vertical height of 42 inches; the midrail shall be at 21 inches, and the toe board 4 inches. When wood railings are used, the post shall be of at least 2 inch by 4 inch stock spaced not to exceed 8 feet, the top rail shall be of at least 2 inch by 4 inch stock, and the intermediate rail shall be of at least 1 inch by 6 inch stock. If pipe is used, it shall be at least 1 ½ inch nominal diameter. If structural steel is used, it shall be of 2 inch by 2 inch by 3/8-inch angles or equivalent. If wire rope is used for railings, it shall have a diameter of at least 2 inch and shall be stretched taut to allow no more than a 3 inch deflection.

- When operating a scissor-lift work platform, the lift shall have guardrails on all open sides, with the door access chains or rails in place.
- Employees operating aerial lifts shall wear a body harness and lanyard attached to the aerial lift. Employees shall not attach the lanyard to an independent structure.
- Employees riding in a crane-suspended work platform shall wear a body harness and lanyard attached to the grab rail of the platform.
- Employees working on or near wall forms or rebar shall wear a body harness lanyard and/or positioning device when exposed to a fall in excess of 6 feet.
- Positioning devices shall be rigged to prevent a free fall greater than 24 inches.
- Stairs, ladders, or ramps shall be provided for all access ways where there is a change in elevation greater than 19 inches.
- Manila or synthetic rope shall not be used as guardrails.
- Employees shall not stand or sit on guardrails.
- Personal fall arrest systems shall not be attached to guardrail systems.
- If warning lines are used, they should consist of rope, wire, or chain, and be flagged at intervals of 6 feet or less with high-visibility material. The lowest point should be no less than 34 inches from the surface and the highest point should be no more than 39 inches. The warning line should be placed at least 6 feet from the edge.
- Safety net systems should be installed as close to the working surface as practical, but in no case more than 25 feet below the working surface and should extend outward at least 8 -13 feet depending on the vertical fall distance. Safety nets should be drop-tested after initial installation and at 6-month intervals. The maximum size of net mesh should not exceed 36 square inches nor be longer than 6 inches on any side. Mesh opening should be secure to prevent enlargement.
- Body belts should not be used for personal fall arrest. Full body harnesses are required.

16.13 Heat Stress

Camp Dresser & McKee Inc. (CDM) employees may be exposed to hazards associated with hot work environments. Factors that contribute to heat exposure include temperature, humidity, personal protective equipment (PPE) radiant heat, sunlight, access to drinking water, exposure duration, and work activity. Individuals vary widely in their susceptibility to heat stress. Factors that may influence individual susceptibility to heat stress include the following:

- Lack of physical fitness
- Lack of acclimatization
- Age
- Dehydration
- Obesity
- Alcohol and drug use
- Infection
- Sunburn
- Diarrhea
- Chronic disease

The following guidelines should be considered when CDM employees or subcontractors perform work:

- In ambient air temperatures above 80 ° F
- That involves heavy physical labor in temperatures above 70 ° F
- In chemical-protective clothing above 70 ° F.

16.13.1 Hazards Associated With Heat Stress

Heat Stroke - Heat stroke is a serious medical emergency and can lead to death if left untreated. It is an acute and dangerous reaction caused by the failure of heat regulating mechanisms of the body. Persons who are elderly, obese, chronically ill, alcoholic, diabetic, or have circulatory system problems are at greater risk.

- Symptoms include red, hot, dry skin, nausea, headache, weakness, dizziness, elevated body temperature, rapid respiration and pulse, coma, or loss of consciousness.
- Treatment for heat stroke:

- Heat stroke is a serious medical emergency. Emergency medical services (911) should be contacted if heat stroke is suspected.
- Move the victim to a cool place, (shade, air conditioned building, vehicle).
- Remove heavy clothing.
- Cool the victim with ice packs, wet towels, or cloth.
- Keep head and shoulders elevated.
- Keep victim's airway open, check breathing and pulse.

Heat Exhaustion – A state of exhaustion or weakness caused by loss of fluids through perspiration and inadequate fluid replacement. Severe cases may result in loss of consciousness, (fainting). This condition can progress to heat stroke if left untreated.

- Symptoms include:
 - Pale, clammy, moist skin, heavy sweating, and extreme weakness.
 - Body temperature is normal, pulse is weak and rapid, breathing is shallow.
 - The person may have a headache, nausea, or feel dizzy.
- Treatment for heat exhaustion:
 - Remove the victim to a cool location. (e.g., shade, air conditioned building, or vehicle).
 - Allow the victim to lie down and prop their legs up.
 - Cool the victim with wet towels, cloth, or cold packs.
 - If the victim is not nauseous they should drink water slowly.
 - If the victim loses consciousness, transport to local medical facility.
 - Continue treatment until symptoms are gone. Consult with CDM medical consultant prior to returning to work.

Heat Cramps – Heat cramps are a condition that can progress to heat exhaustion or heat stroke. Symptoms include severe cramping of the arms, legs, and abdomen. Treatment includes:

- Removing the victim to a cool location. Loosen clothing.
- Having the victim slowly drink cool water.

- Resting the cramping muscles.

Heat Rash - Heat rash is a mild red skin rash, in areas where the body is in contact with clothing or protective gear. The area is likely to itch and can be a source of irritation. Treatment includes decreasing the amount of time in protective gear and applying talcum powder to absorb moisture. When possible, wear breathable clothing to prevent a buildup of moisture within the clothing.

16.13.2 Heat Stress Monitoring

Since the susceptibility to heat stress hazards can vary greatly from one individual to another, often the best way monitor for heat stress is through observing employees and individual physiological monitoring. When working in conditions that have the potential to create heat stress, either heart rate (HR) or body temperature (BT) should be monitored in accordance with the suggested frequency given in Table 16-1 below:

Table 16-1 Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers^a

Adjusted Temperature ^b	Normal Work Ensemble ^c	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

^aFor work levels of 250 kilocalories/hour.

^bCalculate the adjusted air temperature (T_a adj) by using this equation: T_a adj °F = t_a °F + (13 X % sunshine). Measure air temperature (T_a) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow, (100 percent sunshine - no cloud cover and a sharp, distinct shadow; 0 percent sunshine - no shadows).

^cA normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

- **Heart Rate (HR)** - Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the initial rest period. On an individual basis, if the heart rate exceeds 110 beats per minute (BPM), that individual should not return to work until their heart rate drops below 110 BPM and they are fully recovered. If more than one worker has a heart rate that exceeds 110 BPM, a work rest regimen, or other control measures should be implemented to maintain heart rates below 110 BPM.
- **Body Temperature (BT)** - The body temperature may be measured using a clinical oral thermometer or a clinical ear thermometer. On an individual basis, if the body temperature exceeds 99.6 ° F, that individual should not return to work until their body temperature drops below 99.6 ° F and they are fully recovered. If more

than one worker has a body temperature in excess of 99.6 ° F, a work rest regimen, or other control measures should be implemented to maintain body temperatures below 99.6 ° F.

- Personnel should monitor themselves and each other for the development of symptoms such as sudden fatigue, nausea, dizziness, irritability, malaise, flu-like symptoms, and lightheadedness.

16.13.3 Heat Stress Controls and Prevention

- Develop work/rest regimen to maintain physiological parameters within limits described above and prevent development of initial symptoms of heat stress-related conditions. If the physiological limits are exceeded or symptoms develop, the work period should be reduced and rest period increased. Rest areas should be cool, in areas such as shade, air conditioned buildings, or vehicles, and away from heat exposure.
- In extreme heat conditions, employees may wear heat-control clothing such as ice vests or cool suits. Physiological monitoring should still be conducted and work/rest regimens implemented to keep physiological parameters within recommended limits.
- Mobile showers or hoses can be used to cool down workers in waterproof protective clothing.
- Shield sources of radiant heat.
- Provide shaded work areas.
- Conduct activities in early morning and late evening to avoid the hottest parts of the day.
- Allow employees to become acclimatized to the heat by performing less strenuous activities for the first few days. Schedule more physically demanding work later.
- Provide adequate, cool drinking water for consumption during break periods.
- Avoid consumption of beverages such as coffee, tea, or colas that act as diuretics and dehydrate the body.

16.14 Cold Stress

Persons working outdoors in low temperatures, especially below freezing, or in wet or snowy weather are potentially subject to cold stress disorders. Factors that contribute to cold stress exposure include temperature, humidity, wind, sunlight, rain, snow, fog, exposure duration, clothing, and work activity. Individual susceptibility to cold stress disorders can vary widely. Individual physical factors that can affect a person's response to cold work environments include a person's general fitness and age.

The following guidelines should be considered when working in ambient air temperatures below 40 ° F, especially when other contributing weather conditions such as snow, rain, or wind are present.

16.14.1 Hazards Associated with Cold Stress

Hypothermia - Hypothermia results from a cooling of the body's core temperature and if left unattended can become a serious condition. Hypothermia can result in the loss of physical skills and impair judgment thereby contributing to the potential for other accidents. Severe hypothermia can result in death. Hypothermia can occur at temperatures above freezing as well as below.

- Symptoms include shivering, teeth chattering, fumbling hands, slurred speech, and loss of coordination. Eventually the pulse and respiratory rate may slow. The victim may appear blue or lose color in the face.
- Treatment for hypothermia is to catch symptoms early and move the individual to a warm environment indoors or in a vehicle. If a warm location is not immediately available the victim should be sheltered from the wind and provided extra clothing such as coats or blankets, and observed to determine if their condition is improving or not. If the victim continues to deteriorate and becomes colder, they should be transported to a medical facility for assistance.

Frostbite - Frostbite is a condition in which the fluids around cells of body tissue freeze. The condition can lead to body tissue damage. The most vulnerable parts of the body are the nose, ears, cheeks, fingers, and toes.

- Symptoms of frostbite include, body parts becoming white, firm, cold to the touch and may feel waxy. The victim will not feel pain in the affected area.
- Treatment of frostbite requires that the victim be brought to a warm environment and the affected areas be allowed to thaw and warm. If frostbite has progressed beyond small patches of skin and affects whole body parts such as a hand, foot, or ear, the victim should be transported to a medical facility for treatment and observation.

16.14.2 Cold Stress Monitoring

Personnel should monitor themselves and each other for signs and symptoms of frostbite and/or hypothermia. If symptoms are observed in an employee or subcontractor, steps should be taken to treat the symptoms by having the individual go to a warm environment either in a nearby structure or vehicle.

16.14.3 Cold Stress Control and Prevention

Cold stress can easily be prevented with proper planning and prevention. Some basic controls and preventative measures are listed below:

- Forecasted conditions. Consider the effect of wind chill, (See Table 16-2 on next page).
- Dress in layers and stay dry. Avoid cotton clothing such as socks or T-shirts. Bring extra clothing.
- Wear hardhat liners and gloves. Wear rain gear in rain and snow.
- Curtail work if extreme weather conditions such as a blizzard, extreme wind chill, (e.g., less than 0° F), torrential cold rains or wind is expected.
- For long-term projects in cold environments, consider setting temporary structures with portable heaters.
- Take warming breaks as needed.
- Avoid beverages with caffeine, alcohol, or medications that restrict blood flow.
- Drink warm non-caffeine containing beverages such as hot chocolate or soups on breaks.

Table 16-2 Wind-chill Index

WINDCHILL INDEX												
Cooling Power of Wind on Exposed Flesh Expressed as an Equivalent Temperature (under calm conditions)												
Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (°F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
Wind speeds greater than 40 mph have little additional effect	LITTLE DANGER in < hr. with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	From Fundamentals of Industrial Hygiene, Third Edition Plog, B A., Benjamin, G. S., Kerwin, M A., National Safety Council, 1988.											

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16.15 Working Around Heavy Equipment

Good work practices while working around heavy equipment include:

- Assume the operator cannot see you. The operator's vision may be blocked by blind spots. He or she is frequently concentrating on their work and equipment and may not notice a site visitor.
- If you must approach the operator, be sure you have made eye contact with the operator and they know you will be approaching them before approaching the equipment. Verbal contact, direct or by radio, is even better. Do not approach if the equipment is moving or in operation.
- Stay clear of pinch points and swing areas of equipment. On Camp Dresser & McKee Inc. (CDM) projects, these areas should be taped or barricaded off, but when equipment moves frequently, you can't count on other organizations to mark these zones.
- Do not walk near a moving piece of equipment. It could turn or rotate any minute. Modern construction equipment moves fast and in any direction.
- On a noisy site, you may not notice the equipment's back-up alarm. Keep aware of what is happening around you.
- Never walk under a load on a crane or hoist. Indeed, avoid the area under the hook or bucket
- Do not cut across the path of equipment backing up.
- Wear your hardhat and safety glasses. The safety glasses protect your eyes from dust and debris and the hardhat provides protection for your head and makes you more visible on the site.
- On sites where there is frequent vehicle or construction equipment movement, wear high-visibility clothing.
- Maintain a clearance of at least 10 feet between any part of the machine or its load and any electrical line or apparatus carrying up to 50,000 volts. One foot of additional clearance is required for every additional 30,000 volts.

16.18 Safety Working Around Drill Rigs

The use of mechanical drill rigs to collect soil samples and install monitoring wells presents significant hazards to operators, helpers, as well as technicians and engineers who may work in proximity to such rigs. Camp Dresser & McKee Inc. (CDM) employees that manage or oversee drilling operations should be aware of the basic hazards of drilling equipment and operations and have an awareness of safe drilling work practices. The guidelines and work practices described below should be implemented on all projects where mechanical drill rigs are used.

16.18.1 Preparation

- Contract documentation with drillers contracted with CDM should include CDM's standard contract between "Engineer & Subcontractor for Drilling Services," and "Health and Safety Protocol for Subcontractors" available on the Office of General Council's page of contract forms at <http://cdmweb/legalforms/inc.htm>.
- Before drilling or other sub-surface operations, a survey should be conducted to identify any overhead or underground utilities, unexploded ordnance, tanks, pipes, or other underground structures. The local agency or organization for utility location should be contacted to identify underground utilities. In some cases, ground penetrating radar or magnetometer studies may be needed to identify the location of underground obstructions.
- The work area for the drill rig and crew should be cleared of sticks, logs, brush, and trash. Inspect the area for any potential tripping hazards and remove them. If they cannot be removed, they should be identified with caution tape or cones.
- Prior to rig set-up the planned arrangement of equipment should be such that it does not present a dangerous condition. Take into account slopes of hills, mud, standing water, overhead power lines etc.
- OSHA regulations require that any part of the rig must be at least 10 feet away from power lines under 50kV or less. For higher voltage lines, one foot of additional clearance is required for every additional 30,000 volts.
- If working in an area of moving vehicular traffic, appropriate traffic control systems should be in place. Contact local police or traffic control officer, before placing any traffic control equipment. See Section 16.22.
- Define an exclusion zone around the drill rig that is at least 1.5 times the height of the mast. Only personnel necessary for the immediate task being performed should be inside the exclusion zone.

16.18.2 Drill Rig Inspection

- After the rig is set up, but prior to operation, the work area should be inspected for eye, bump, and tripping hazards.

- The driller should inspect the rig daily prior to operation of the rig. The inspection should include the following:
 - Condition of the vehicle itself. Brakes should work and tires should have adequate tread. It should have a back-up alarm. If it is driven over the road, it should have all necessary brake lights, headlights, horn, license plates, etc.
 - All welds should be solid with no sign of visible cracks.
 - All gauges should be functional and legible.
 - All machine guards should be in place.
 - Emergency kill switches should be functional. All site personnel should be aware of the location and function of the kill switches. Have the driller review these with site personnel.
 - Cable and wire rope should be inspected for fraying, decay, "bird caging," broken strands, kinking or flattening.
 - All hoses should be secure and in good shape. They should not be loose, bulging, or leaking.
 - High-pressure fittings should be secure and have whip checks (A pin or wire to prevent the hose whipping in the event of a failure of the connection).
 - High-pressure relief valves should be in working order.
 - Wire rope loops should be secure with at least two clamps.
 - The rig should have a fire extinguisher and first aid kit.
 - All tools should be clean and in good working condition. Hooks, eyes, pins, etc. should not be corroded or bent. Rod clamps should be in good condition.
 - If a cathead is used, it should be clean and free of burrs. The cathead rope should be in good condition and not be frayed or have excessive wear.
 - Back-up alarms should be functional.
 - Vehicles should have all lug nuts and they should all be tight.

16.18.3 Work Practices

- All personnel working around drilling operations should wear appropriate personal protective equipment including a hard hat, safety glasses, and hard-toed work boots.
- Drill crews should wear work gloves.

- On hazardous waste sites, additional PPE such as respirators, protective clothing, gloves, etc. may also be required.
- In areas where there is vehicular traffic, personnel should also wear high-visibility vests or clothing.
- Maintain an organized work area free from tripping hazards.
- Drill rods or other equipment should not be stored leaning up against equipment.
- Drill holes should be completed or secured before leaving the site for the day. Drill holes should not be left open at an unattended site.
- Boring locations should be placed to minimize the possibility of contacting underground utilities or structures. Clearance should be obtained from the site project manager before drilling begins.
- Do not move the rig with the mast in the upright position.
- Use a spotter when moving the rig from one location to another on the site.
- When sampling activities require working in proximity with heavy equipment or drill rigs, sampling personnel will stand clear of the equipment until sampling is required. They will notify the operator they are going to take a sample and must receive acknowledgment from the operator.
- Do not wear loose clothing such as hooded sweatshirts, parkas, or clothing with hanging drawstrings around drill rigs.
- Monitor weather conditions. Drilling operations should be terminated and the area near the drill rig evacuated during high winds and or storms with the potential for lightning strikes. The lead driller should be consulted to help assess if weather conditions are safe for drilling.
- Drill crew personnel should wear a personal fall arrest harness, connected to a secure tie-off point, when climbing the mast or working where fall exposures exceed 6 feet.
- Hearing protection should be worn during operations that produce significant noise exposures. (If you cannot hold a conversation using a normal voice with someone within 3 feet of you because of background noise, the use of personal hearing protection is recommended.)

16.20 Hazardous Waste Site Controls

Work sites designated as Hazardous Waste Sites must control access to the work area to only authorized personnel and conform to general work practices expected at hazardous waste site operations as required by the OSHA Standard for Hazardous Waste Operations, 29 CFR 1910.120. The following concepts should be reflected in the health and safety plan for the project.

16.20.1 Access Control

Controlled access to hazardous waste site work areas is required to protect personnel working on the site as well as to limit the potential for transporting contaminants off site. Depending on the size of the work site, hazards and contaminants present, and complexity of the work, access control may range from verbally cautioning non-authorized personnel to stay away from the work area, to a program including site security, signs, or formal sign in and sign out procedures. Details of site-specific access control procedures should be included in the site-specific health and safety plan. Some general work practices for access control are noted below:

For small-scale site investigations that are short-term projects (i.e. days not weeks or months), identify a work area to the work crew and keep persons not associated with the job site out of the work area. If the site is in an area where non-authorized persons are likely to be encountered, traffic cones, caution tape, and signs identifying the area as a controlled access area may be used.

For more extensive projects where work may be done for weeks or longer, the team the should deploy more extensive access controls. They should:

- Set up physical barriers and hire security personnel to prevent non-authorized persons from entering the work site.
- Keep the number of personnel and equipment on site to the minimum required to do the project effectively and safely.
- Establish work zones within the site, (see the next section- work zones).
- Establish controlled access points to be used by authorized personnel.
- Track the entry and exit of personnel through a check-in, checkout system.
- Establish a formal decontamination corridor from exclusion zones.

16.20.2 Work Zones

Field project managers, working under health and safety plans for hazardous waste operations are required to establish work zones to prevent or reduce the spread of site contaminants to non-contaminated areas on or off site. Movement between zones should be restricted to those that need access to a specific area, and entry and exit between zones should be through designated access control points. A description of the three work-zone system for hazardous wastes is provided below.

Exclusion Zone - The exclusion zone should include any area where contamination is known or suspected. Areas of air, water, or soil that are contaminated with hazardous

materials (biohazards, radioactive materials, chemicals) should be included in the exclusion zone. The zone should be well known to site workers. On smaller projects, this can be a verbal identification to site workers, such as "A 20-foot radius around the drill rig". On larger projects, or in areas that may be encountered by observers or the general public, the zone may need to be defined with caution tape, traffic cones or in some instances, fencing and barriers. The need will be site specific and the specific method should be identified in the site-specific health and safety plan. Some work practices that should be followed in the exclusion zone include:

- Employees in the exclusion zone must wear the PPE designated in the site health and safety plan for tasks executed within the zone.
- No eating, drinking, chewing gum or tobacco, smoking, application of cosmetics, including application of lip balm, sunscreen, or insect repellent is allowed in the exclusion zone.
- Sitting or kneeling in areas of high concentrations of contaminants should be avoided.
- If any PPE becomes defective, the employee should leave the work area via the designated egress area, decontaminate as needed, and replace the defective PPE before returning to work in the exclusion zone.
- Prescription drugs should not be used within the exclusion zone unless approved by CDM's medical consultant. The use of illegal drugs or consumption of alcohol is prohibited.
- When leaving the exclusion zone, employees should exit via the designated access/egress point(s) and follow decontamination procedures described in the site health and safety plan.

Contaminant Reduction Zone (CRZ)– A CRZ is established to provide a transition between the exclusion zone and the support zone. The CRZ is set up at the access control points of the exclusion zone and will vary in size depending on the complexity of activities that need to occur within the zone. For small site investigations, the CRZ may simply be a designated area near containers set up to collect used disposable PPE and some soap and water. For larger projects, the CRZ may include specific decontamination points and be staffed by personnel specifically designated to participate in the decontamination of personnel and equipment exiting the exclusion zone. Depending on the site contaminants, level of contamination, and decontamination procedures, personnel in the CRZ may be required to wear protective clothing, gloves, or respirators. The specific requirements will be outlined in the site health and safety plan. The CRZ should be placed in an area that is not contaminated at the boundary of the exclusion zone.

Support Zone - The support zone is established near the entrance to the site and is far enough from the exclusion zone and CRZ that specialized protective clothing or respirators are not used. The use of normal field PPE such as hard hats, safety glasses, and safety work boots is expected except for areas such as office trailers, break and lunch areas, or other areas designated as having no known or anticipated hazards. Operational support activities and equipment storage and maintenance areas are located

in the support zone. No equipment or personnel should go from the exclusion zone to the support zone without passing through the CRZ and being decontaminated in accordance with the site health and safety plan.

Mobile Work Zone - For those projects that involve brief periods of work in multiple locations, a specific area may be designated as the exclusion zone for the duration of the work performed in that area. The exclusion zone can be terminated (provided there are no ongoing hazards or potential exposures to contaminants) and moved to the next area of work. For example, during soil borings or well installation, the exclusion zone can be defined as, "1.5 times the mast height" of the drill rig. Once the boring has been closed, or well installed and secured, and all drill cuttings have been secured, the area can be opened up and a new exclusion zone established around the next boring location.

16.20.3 Considerations When Establishing Work Zones

Work zones should be large enough to perform tasks within the zone safely, with no exposure to hazards to personnel outside the zone, but they should also be small enough to be able to secure and control access. Some considerations in establishing work zones include:

- Physical and topographical features of the site.
- Dimensions of the contaminated area.
- Weather.
- Physical, chemical, and toxicological characteristics of contaminants and chemicals used in the zone.
- Potential for exposure to site contaminants.
- Known and estimated concentrations of contaminants.
- Air dispersion of contaminants.
- Fire and explosion potential.
- Planned operations and space needed to perform the work safely.
- Surrounding areas.
- Decontamination procedures.
- History of job site.

16.20.4 General Hazardous Waste Site Work Practices

- **Buddy System** - Work should be scheduled so that no person works unobserved within the exclusion zone at any time. Each worker within the exclusion zone should maintain visual contact with at least one other worker on the site. All site personnel should remain aware of each other and monitor each other's condition.
- **Eating, drinking, chewing gum or tobacco, and smoking** - are prohibited within the contaminant reduction and exclusion zones. (Exception for heat stress: Squirt bottles of water, Gatorade, or other fluids may be consumed via squirt bottles in the

contaminant reduction zone with the approval of the health and safety manager. Open bottles, cups, etc. should not be permitted.)

- Sitting or kneeling should be avoided in areas of known or suspected areas of contamination.
- Hands and face should be thoroughly washed when leaving the work area.
- Defective PPE should be repaired or replaced immediately.

Sections 5,6, 7, 9, and 11 of this manual are particularly in applicable to health and safety at hazardous waste sites.

16.21 Decontamination at Hazardous Waste Sites

Proper decontamination helps protect employees and prevents the contamination of uncontaminated areas. Decontamination protects all site personnel by minimizing the transfer of harmful materials into clean areas. It helps prevent mixing of incompatible chemicals and protects the community by preventing uncontrolled transportation of contaminants from the site.

16.21.1 Prevention of Contamination

To prevent contamination, Crew members should:

- Follow procedures for proper dressing prior to entry into the exclusion zone. Proper dressing will minimize the potential for contaminants to bypass the PPE and escape decontamination.
- Protect monitoring and sampling instruments by bagging. Make openings in the bags for sample ports and sensors that must contact site materials, or cover equipment and tools with a strippable coating, which can be removed during decontamination.
- Encase any source of contaminants on the site with barriers (e.g., plastic sheeting or over packs).
- Stress work practices that minimize contact with hazardous substances. Use remote sampling, handling, and container-opening techniques.

16.21.2 Decontamination Equipment Selection

In selecting decontamination equipment, consider whether the equipment must be decontaminated for reuse or can be easily disposed of. Recommended equipment for decontamination includes:

- Storage tanks or appropriate treatment systems
- Drains or pumps
- Long-handled brushes
- Wash solutions appropriate for the contaminants present
- Rinse solutions appropriate for the contaminants present
- Pressurized sprayers for washing and rinsing
- Curtains, enclosures, or spray booths
- Long-handled rods and shovels
- Containers to hold contaminants and contaminated soils

- Wash and rinse buckets
- Brooms
- Containers for the storage and disposal of contaminated material

16.21.3 Decontamination Design

Decontamination facilities should be located in the contamination reduction zone (CRZ), i.e., the area between the exclusion zone (the contaminated area) and the support zone (the clean area) and described in the Site H & S Plan.

- Site-specific factors that affect the decontamination facility design must be considered. Typical factors include:
 - The chemical, physical, and toxicological properties of the wastes.
 - The pathogenicity of infectious wastes.
 - The amount, location, and containment of contaminants.
 - The potential for, and location of, exposure based on assigned worker duties, activities, and functions.
 - The potential for wastes to permeate, degrade, or penetrate materials used for personal protective clothing and equipment, vehicles, tools, buildings, and structures.
 - The proximity of incompatible wastes.
 - The movement of personnel and/or equipment among different zones.
 - The emergencies that may arise.
 - The methods available for protecting workers during decontamination.
 - The impact of the decontamination process and compounds on worker health and safety.
- Decontamination Line
 - Decontamination should be an organized process by which levels of contamination are reduced.
 - The decontamination process consists of a series of steps performed in a specific sequence. For example, outer, more heavily contaminated items are decontaminated first, followed by the decontamination and removal of inner, less contaminated items.

- Each step should be performed at separate stations to prevent cross contamination.
- Decontamination stations should allow enough separation to prevent cross contamination and should be arranged in order of decreasing contamination.
- Separate decontamination areas should be provided to isolate workers from different contamination zones containing incompatible wastes or decontamination processes.
- Entry and exit points should be conspicuously marked. Preferably the entry to the CRZ from the exclusion zone should be separate from the entry to the exclusion zone from the CRZ.
- Dress-out stations for entry to the CRZ should be separate from redressing areas for exit from the CRZ.
- Personnel who wish to enter clean areas of the decontamination facility, such as locker rooms, must be appropriately decontaminated first.
- Examples of decontamination lines and procedures for personnel wearing various levels of protection are provided in Exhibits 16A and B.

16.21.4 PPE for Decontamination Workers

A rule of thumb is that decontamination workers wear a level of protection one level below the level of protection worn in the exclusion zone. However, consideration should be given to the following when determining the level of protection for a given project.

- The nature of site contamination.
- Degree of contamination expected on workers leaving the exclusion zone.
- The results of wipe tests and onsite air monitoring.

Some site-specific cases may require that decontamination personnel wear the same level of PPE as workers in the exclusion zone. Cases include:

- Workers using a steam jet may need a different type of respiratory protection than other decontamination personnel because of the high moisture content of the steam jets.
- Cleaning solutions used and wastes removed during decontamination may generate harmful vapors, requiring a different type of respiratory or clothing protection.

16.21.5 Decontamination Methods

All personnel, clothing, equipment, and samples leaving the contaminated area of a site should be decontaminated to remove any harmful chemicals, radioactive material, or infectious organisms that may have adhered to them. The extent of decontamination will vary depending on the nature of site activity, site contamination, and other factors.

- Decontamination methods available include:
 - Physical removal
 - Chemical detoxification or disinfections/sterilization.
 - A combination of both physical and chemical methods.
- The selected decontamination method should be reviewed for any safety and health hazards. If the selected method poses a direct health hazard, measures shall be taken to protect both the decontamination personnel and the workers to be decontaminated.
- Physical Removal
 - Physical methods using high pressure and/or heat should be used with caution.
 - Loose contaminants can be removed by using a soap and water rinse with a soft bristle brush to remove dust and vapors that cling to equipment and workers, or that are trapped in small openings, such as clothing or fabric weaving.
- Adhering contaminants can be removed by:
 - Scraping, brushing and wiping.
 - Solidifying.
 - Freezing (using dry ice or ice water).
 - Adsorption or absorption (e.g., kitty litter or powdered lime).
 - Melting.
 - Volatile liquid contaminants can be removed from PPE or equipment by evaporation followed by a water rinse. Evaporation may be expedited by the use of steam jets.

- **Chemical Removal**
 - Decontamination using chemicals should only be done if recommended by an industrial hygienist or other qualified professional.
 - Any chemical used in the decontamination process must be chemically compatible with the equipment or clothing being decontaminated.
 - Halogenated solvents should only be used for decontamination in extreme cases where other cleaning agents will not remove the contaminant.
- **Chemical removal types include the following:**
 - Surface contaminants can be dissolved in a solvent.
 - Solidification of liquid or gel contaminants can enhance their physical removal. Typical solidification processes are moisture removal using adsorbents such as grounded clay or powdered lime; and chemical reactions using polymerization chemicals and/or chemical reagents.

16.21.6 Personnel Decontamination

Different levels of personnel protection, as discussed in the PPE guidelines, may be used at any given site. The following is a description of the decontamination process for each level of protection.

- **Level D**
 - An area should be designated for the gross removal of dirt and mud from gloves and boot covers. Paper towels and buckets of rinse water can be made available for this purpose.
 - Typical decontamination steps for level D operations are provided in Exhibit 16-A.
 - Soap and water should be used to wash hands and face before leaving the site.
 - Laundering of personal clothing should be completed as soon as possible once offsite.
- **Level C & B**
 - A decontamination line should be established.
 - Site-specific procedures should be outlined in the site H&S plan. The recommended procedure for this layout is listed in Exhibit 16-B.

- **Level A** -It is not anticipated Camp Dresser & McKee Inc. (CDM) will directly participate in level A operations. If required, site-specific procedures will be developed in coordination with the division H&S manager.

16.21.7 Sampling and Monitoring Equipment Decontamination

Sampling equipment often becomes grossly contaminated. Often trowels or drum thieves are dedicated to a particular site. These should be left in the exclusion zone and disposed of as contaminated waste at the end of site work. Sampling equipment such as split spoons or other equipment that is used to collect several samples must be cleaned and decontaminated between samples to prevent cross contamination. These items should be cleaned and decontaminated in the project operations or sampling plan. Dirt and wash solutions from sampling equipment decontamination should be collected and disposed of as investigation-derived waste.

Once grossly contaminated, testing and monitoring instrumentation can be difficult to decontaminate without causing damage to the instrument. Care should be taken in the field to prevent gross contamination of field instruments by avoiding direct contact between the instrument and contaminated soils, water or surfaces. In some cases it may be necessary to place instruments in plastic bags, leaving small openings for sampling ports, detectors, and exhaust ports. The plastic bags can then be removed as the instrument comes out of the exclusion zone. The outside of instruments can be wiped down with paper towels or brushed off with clean soft brushes.

16.21.8 Heavy Equipment Decontamination

Drill rigs, trucks, backhoes, and other heavy equipment can be difficult to decontaminate. The method generally used is to wash them with water under pressure and scrub accessible areas with soap and warm water. Hot water and steam systems can be effective but may increase air concentrations of contaminants, exposing decon workers. Particular care should be taken where equipment comes into direct contact with contaminated soils such as tires, buckets, or treads. In severe cases, tires may need to be replaced or parts sand blasted clean or disposed of. Equipment should be visually inspected to be sure it is free of any visible signs of contamination. In some cases, wipe tests or other methods may be needed to confirm equipment has been adequately decontaminated before leaving the site.

16.21.9 Decon Solutions, Disposable PPE, and Site Wastes

Potentially contaminated equipment, disposable PPE, respirator cartridges, disposable sampling equipment, brushes, buckets, waste decon solutions etc., should be secured in drums and labeled. Disposal methods for these materials may depend on client requirements and/or results of site investigation data. The confirmed presence of hazardous materials on the site may require disposal of investigation-derived wastes as hazardous wastes.

Care should be taken during work and decontamination activities to minimize waste materials generated.

Exhibit 16-A Minimum Measures For Level D Decontamination

<u>Station 1 - Equipment Drop</u>	Deposit equipment used on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather, a cool down station may be set up in this area.
<u>Station 2 - Outer Garment, Boots, and Gloves Wash and Rinse</u>	Scrub outer boots, outer gloves, and suit with decontamination solution or detergent/water. Rinse off using copious amounts of water.
<u>Station 3 - Hard Hat, Outer Boot, and Glove Removal</u>	Remove hard hat, outer boots and gloves.
<u>Station 4 - Boots, Gloves, and Outer Garment Removal</u>	Remove boots, suit, and inner gloves and deposit in separate containers lined with plastic.
<u>Station 5 - Field Wash</u>	Wash hands and face.

Exhibit 16-B Minimum Measures For Level B, And C Decontamination

<u>Station 1 - Equipment Drop</u>	Deposit equipment used on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather, a cool down station may be set up in this area.
<u>Station 2 - Outer Garment, Hard Hat, Boots, and Gloves Wash and Rinse</u>	Scrub outer boots, outer gloves, and suit with decontamination solution or detergent/water. Rinse off using copious amounts of water.
<u>Station 3 - Tank/ Air Canister Change</u>	If a worker leaves the exclusion zone to change an air tank, air canister, or mask, this is the last step in the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boots donned, and joints tapped. Worker returns to duty.
<u>Station 4 - Hard Hat, Outer Boot, and Glove Removal</u>	Remove outer boots and gloves. Deposit in container with plastic liner.
<u>Station 5 - Inner Gloves and Outer Garment Removal</u>	Remove suit, and inner gloves and deposit in separate containers lined with plastic.
<u>Station 6 - SCBA/Respirator Removal</u>	SCBA backpack and face-piece/respirator is removed (avoid touching face with fingers). SCBA or respirator is deposited on plastic sheets.
<u>Station 7 - Field Wash</u>	Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face.

16.22 Traffic and Work Zone Safety

These guidelines apply whenever Camp Dresser & McKee Inc. (CDM) employees or subcontractors work in areas exposed to vehicular traffic on public streets or highways.

- Where vehicular traffic hazards exist because of work at locations near public streets or roads, a system of traffic and work zone controls should be developed to mitigate the hazard. The system should meet the requirements of Part 6 of the Manual of Uniform Traffic Control Devices published by the Federal Highway Administration, or the applicable state version of the MUTCD.
- In general, when the MUTCD allows to use of traffic safety direction devices, like cones, CDM will supplement those direct and devices with a physical barrier, like a truck.
- All traffic control systems on public roads must be coordinated with local traffic control officials as required by applicable law.
- Periodically evaluate effectiveness of temporary traffic control set ups by walking or riding the job area looking for evidence of poor controls and near misses such as swerving traffic, motorists braking quickly, skid marks, blind spots, etc.
- Give motorists plenty of advanced warning of upcoming work zones.
- All employees working within designated work zones or near vehicular traffic should wear high visibility clothing such as orange, yellow or yellow-green shirts, jackets or vests. During wet or inclement weather similarly colored rainwear should be worn.
- During night work, between the hours of sunset and sunrise, high visibility clothing should incorporate reflective striping or fabric and be visible at a distance of 1,000 feet. This clothing should meet ANSI standard #107 for High Visibility Safety Apparel.
- All employees working near traffic and vehicles must maintain situational awareness at all times. Stay mindful that warning signs and cones, inform drivers to take action, but that some may not pay attention and vehicles may still enter the work zone.